GROUP 23B

CONTINUOUSLY VARIABLE TRANSMISSION OVERHAUL

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GENERAL INFORMATION

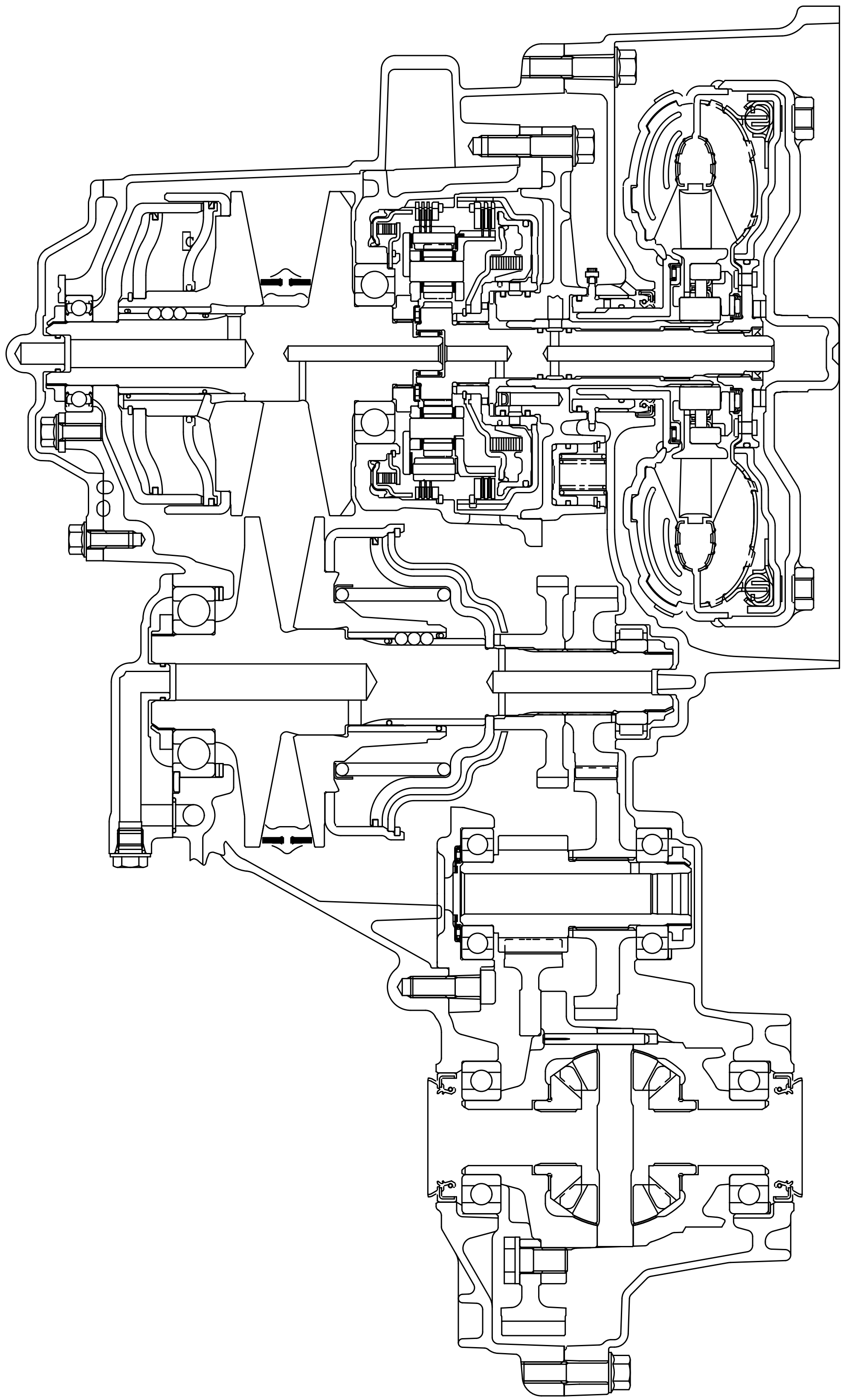
M1233200100140

AUTOMATIC TRANSMISSION MODELS

Transmission model	Combined engine	Vehicle model
F1C1A-1-L2Z	4A91 D4 MIVEC	Z23A

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SECTIONAL VIEW



AK402184

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GENERAL SPECIFICATIONS

M1233201000157

Transmission model		**F1C1A-1-L2Z**
Torque converter	Stall torque ratio	2.0
Forward gear ratios		2.319 – 0.445
Reverse gear ratio		2.588
Final reduction ratio		5.219

SERVICE SPECIFICATIONS

M1233202000105

Item	**Standard value**
Input shaft end play mm	0.30 – 0.60
Output shaft end play mm	0.045 – 0.165
Differential bearing end play mm	0.045 – 0.165
Forward clutch piston end play mm	1.2 – 1.4
Reverse brake piston end play mm	1.6 – 1.8
Backlash between differential side gear and pinion mm	0.045 – 0.150

VALVE BODY SPRING IDENTIFICATION TABLE

M1233203000078

	Wire diameter mm	**Outside diameter mm**	**Inside diameter mm**	**Free length mm**	**Number of loops**
Shift control valve spring	0.9	–	5.1 ± 0.15	16.50	9
Reducing valve spring	1.4	–	6.8 ± 0.15	33.88	13
Damper clutch control valve spring	0.6	5.2 ± 0.15	–	26.52	16
One-way valve spring	0.6	4.5 ± 0.1	–	13.46	13
Primary pressure relief valve spring	1.4	–	7.5 ± 0.15	36.09	15
Torque converter pressure control valve spring	1.4	–	8.0 ± 0.2	39.30	12
Regulator valve spring	1.0	–	6.9 ± 0.2	25.62	11
Clutch pressure reducing valve spring	1.2	–	6.0 ± 0.15	24.95	11
Line pressure relief valve spring	1.2	–	7.5 ± 0.15	40.71	13
Clutch pressure control valve spring	0.9	–	4.1 ± 0.15	29.50	17

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SNAP RING, SPACER AND THRUST WASHER FOR ADJUSTMENT

M1233204000101

THRUST WASHER (FOR ADJUSTMENT OF INPUT SHAFT END PLAY)

Thickness mm	Identification symbol
1.8	18
2.0	20
2.2	22
2.4	24
2.6	26
2.8	28

SPACER (FOR ADJUSTMENT OF OUTPUT SHAFT END PLAY)

Thickness mm	Identification symbol
1.28	28
1.37	37
1.46	46
1.55	55
1.64	64

SPACER (FOR ADJUSTMENT OF DIFFERENTIAL CASE END PLAY)

Thickness mm	Identification symbol
1.10	J
1.19	L
1.28	N
1.37	P
1.46	R
1.55	T
1.64	V
1.73	X
1.82	Z

SNAP RING (FOR ADJUSTMENT OF FORWARD CLUTCH PISTON END PLAY AND REVERSE BRAKE PISTON END PLAY)

Thickness mm	Identification color
1.6	None
1.7	Blue
1.8	Brown
1.9	None
2.0	Blue
2.1	Brown
2.2	None
2.3	Blue
2.4	Brown

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Thickness mm	Identification color
2.5	None
2.6	Blue
2.7	Brown
2.8	None
2.9	Blue
3.0	Brown

SPACER (FOR ADJUSTMENT OF BACKLASH BETWEEN DIFFERENTIAL SIDE GEAR AND PINION)

Thickness mm	Identification
0.75 – 0.82	–
0.83 – 0.92	–
0.93 – 1.00	–
1.01 – 1.08	–
1.09 – 1.16	–

TORQUE SPECIFICATIONS

M1233205000074

Item	Torque N·m
Oil guide bolts	6.0 ± 1.0
Reaction shaft support bolts	48 ± 6
Oil pump bolts	11 ± 1
Bearing retainer bolts	48 ± 6
Oil pipe bolts	11 ± 1
Converter housing bolts	48 ± 6
Valve body bolts	11 ± 1
Valve body cover bolts	11 ± 1
Primary rear cover bolts	23 ± 3
Secondary rear cover bolts	23 ± 3
Inhibitor switch bolts	11 ± 1
Manual control lever nut	22 ± 3
Secondary pressure sensor	19 ± 3
Primary pressure sensor	19 ± 3
Primary speed sensor bolt	11 ± 1
Turbine speed sensor bolt	11 ± 1
Secondary speed sensor bolt	11 ± 1
Oil cooler feed tube bolts	11 ± 1
Eyebolts	30 ± 3
Harness bracket bolt (M6)	11 ± 1
Harness bracket bolt (M8)	23 ± 3
Control cable support bracket bolts	23 ± 3

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Outside valve body bolts	11 ± 1
Solenoid valve bolts	6.0 ± 1.0
Adjusting screw assembly bolts	6.0 ± 1.0
Inside separating plate bolts	6.0 ± 1.0
Detent spring bolt	6.0 ± 1.0
Output shaft lock nut	190 ± 20
Differential drive gear mounting bolts	135 ± 5

SEALANTS

M1233206000055

Item	Specified sealant
Torque converter housing*	Mitsubishi genuine sealant Part No. MD974421 or equivalent
Valve body cover*	
Primary rear cover*	
Secondary rear cover*	

*NOTE: *FIPG should be used on the asterisked parts.*

FORM-IN-PLACE GASKET (FIPG)

This transmission has several areas where the form-in-place gasket (FIPG) is used for sealing. To ensure that the FIPG fully serves its purpose, it is necessary to observe some precautions when applying it. Bead size, continuity and location are of paramount importance.

Too thin a bead could cause leaks. Too thick a bead, on the other hand, could be squeezed out of location, causing blocking or narrowing of fluid passages. To prevent leaks or blocking of passages, therefore, it is absolutely necessary to apply the FIPG evenly without a break, while observing the correct bead size.

FIPG hardens as it reacts with the moisture in the atmospheric air, and it is usually used for sealing metallic flange areas.

Disassembly

Parts sealed with a FIPG can be easily removed without need for the use of a special method. In some cases, however, the FIPG in joints may have to be broken by tapping parts with a mallet or similar tool.

Surface Preparation

Thoroughly remove all substances deposited on the FIPG application surface, using a gasket scraper. Make sure that the FIPG application surfaces is flat and smooth. Also make sure that the surface is free from oils, greases and foreign substances. Do not fail to remove old FIPG that may remain in the fastener fitting holes.

FIPG Application

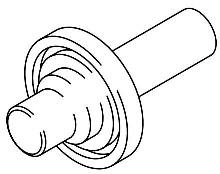
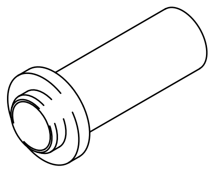
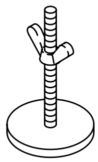
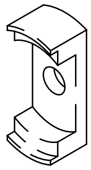
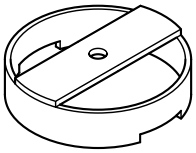
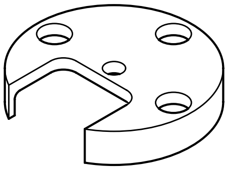
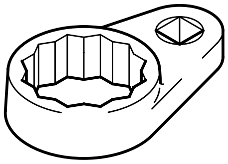
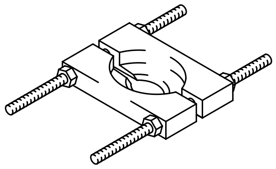
Applied FIPG bead should be of the specified size and free of any break. FIPG can be wiped away unless it has completely hardened. Install the mating parts in position while the FIPG is still wet (in less than 10 minutes after application). Do not allow FIPG to spread beyond the sealing areas during installation. Avoid operating the transmission or letting oils or water come in contact with the sealed area before a time sufficient for FIPG to harden (approximately one hour) has passed.

FIPG application method may vary from location to location. Follow the instruction for each particular case described later in this manual.

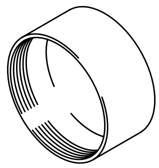
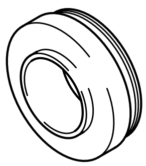
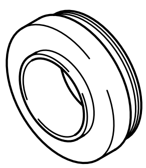
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SPECIAL TOOLS

M1233207000100

Tool	Number	Name	Use
	MD998800	Oil seal installer	Installation of drive shaft oil seal
	MD998334	Oil seal installer	Installation of torque converter oil seal
	MD998924	Spring compressor retainer	• Removal and installation of snap rings in forward clutch and reverse brake • End play adjustment of forward clutch and reverse brake
	MD999590	Spring compressor	Removal and installation of snap ring in forward clutch
	MB991628	Spring compressor	End play adjustment of forward clutch and reverse brake
	MD999577	Spring compressor	Removal and installation of snap ring in reverse brake
	MD998809	Lock nut wrench	Removal and installation of output shaft lock nut
	MD998801	Bearing remover	Removal of output shaft bearing and differential bearing

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Tool	Number	Name	Use
	MD998812	Installer cap	Used together with Installer adapter
	MD998818	Installer adapter (38)	Installation of output shaft bearing
	MD998819	Installer adapter (40)	Installation of differential bearing

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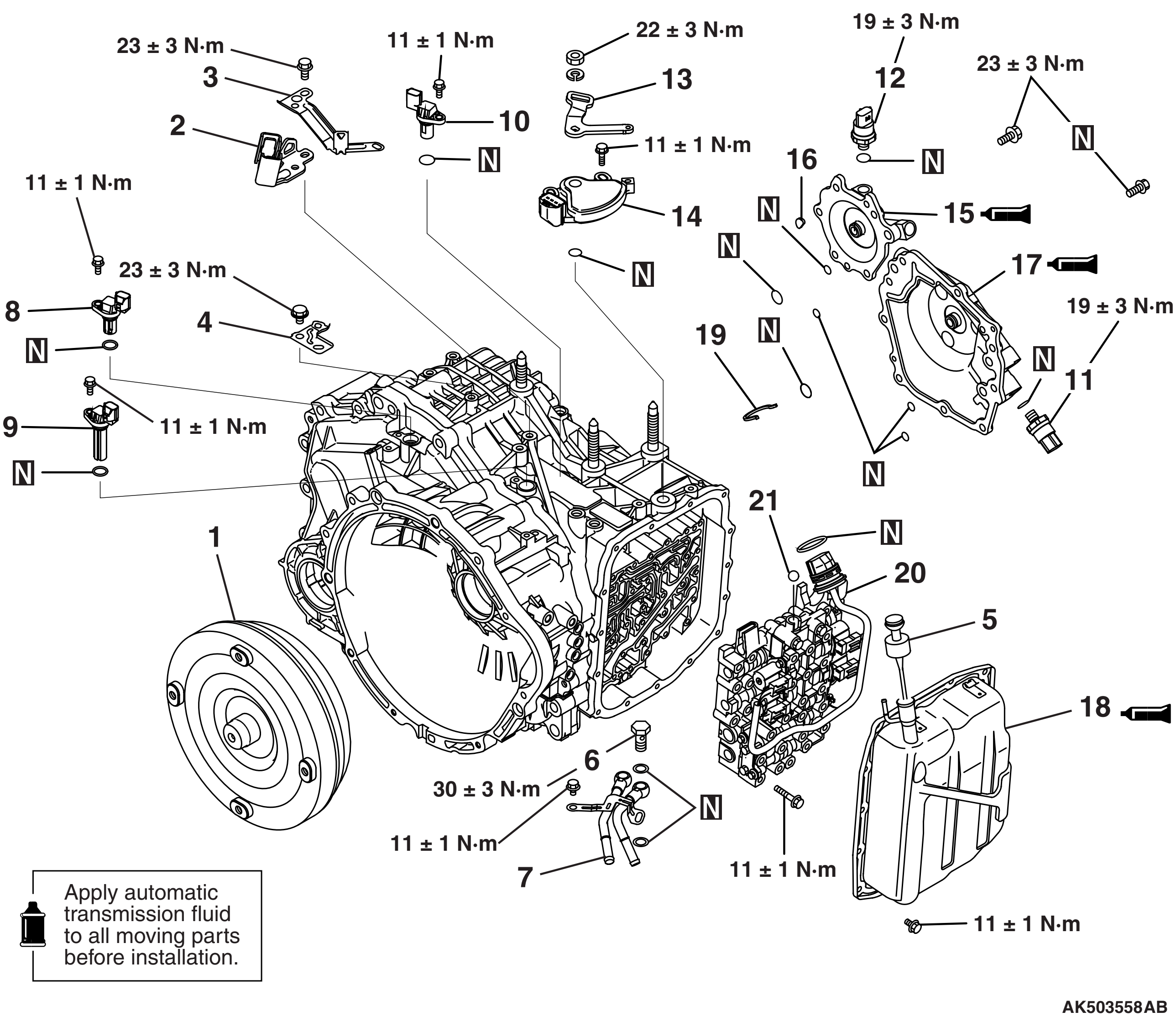
TRANSMISSION

DISASSEMBLY AND REASSEMBLY

M1233208000114

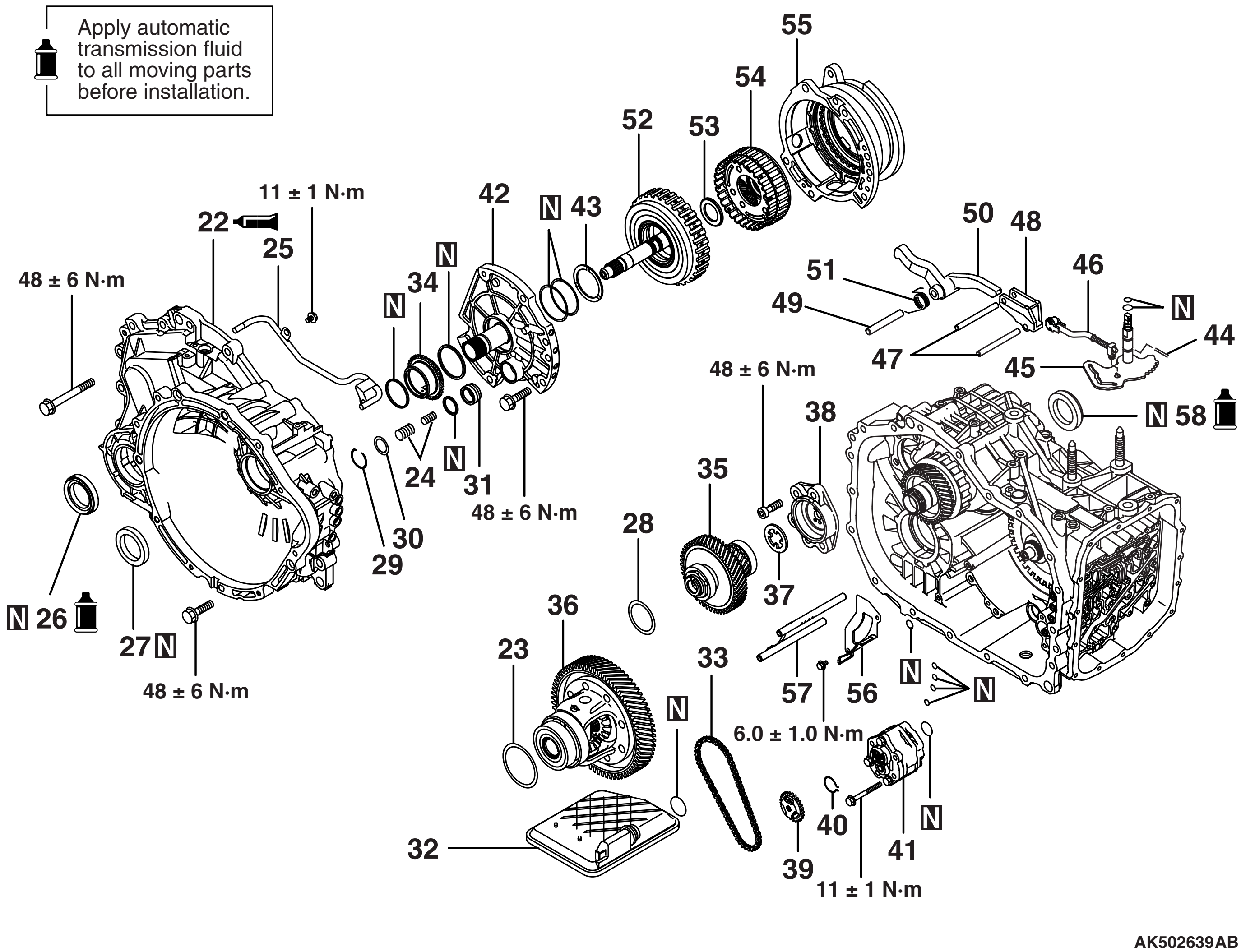
⚠ CAUTION

- **The valve body assembly underwent fluid pressure adjustments at the factory. Do not disturb setting of the adjusting screw.**
- **The shift control solenoid valve must be installed into the original position whenever it has been removed. Otherwise the factory-adjusted primary pressure characteristics will be affected.**



1. Torque converter
2. Control cable support bracket
3. Harness bracket
4. Harness bracket
5. Oil level gauge
6. Eyebolt
7. Oil cooler feed tube
8. Secondary speed sensor
9. Turbine speed sensor
10. Primary speed sensor
11. Primary pressure sensor
12. Secondary pressure sensor
13. Manual control lever
14. Inhibitor switch
15. Secondary rear cover
16. Stopper
17. Primary rear cover
18. Valve body cover
19. Solenoid valve harness connector clamp
20. Valve body
21. Steel ball

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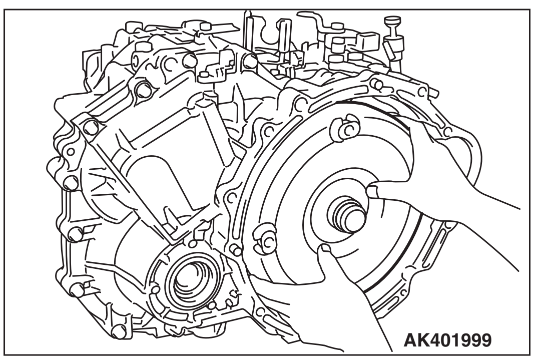
22. Converter housing
23. Spacer
24. Accumulator spring
25. Oil pipe
26. Oil seal
27. Oil seal
28. Spacer
29. Snap ring
30. Stopper plate
31. Accumulator piston
32. Oil filter
33. Chain
34. Oil pump drive sprocket
35. Output shaft
36. Differential
37. Thrust bearing
38. Bearing retainer
39. Oil pump driven sprocket
40. Snap ring
41. Oil pump
42. Reaction shaft support
43. Thrust washer
44. Pin
45. Manual control shaft
46. Parking roller rod
47. Parking roller support shaft
48. Parking roller support
49. Parking sprag shaft
50. Parking sprag
51. Spring
52. Forward clutch
53. Thrust bearing
54. Planetary carrier
55. Reverse brake
56. Oil guide
57. Belt lubricating pipe
58. Oil seal

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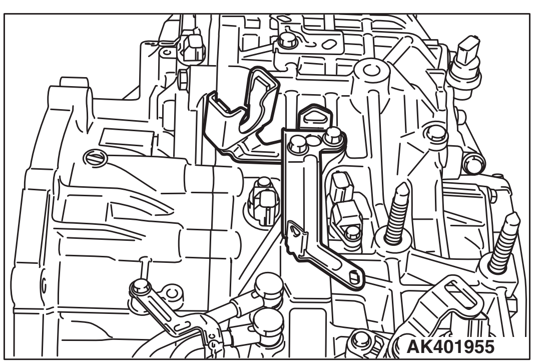
DISASSEMBLY SERVICE POINTS

⚠ CAUTION

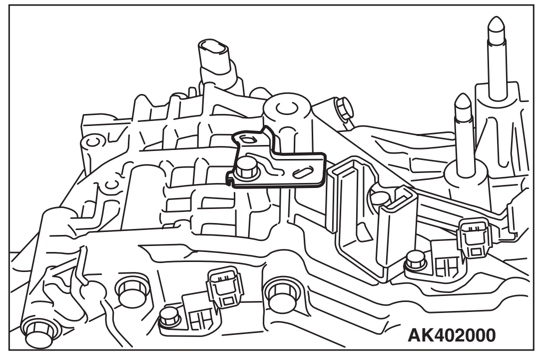
- **The automatic transmission includes many high-precision components. All parts must be handled carefully not to give damage to them when the transmission is disassembled and reassembled.**
- **Place a rubber mat over the bench on which disassembly work is going to be performed. Always keep the mat surface clean.**
- **Do not use cotton gloves and shop towel or rag when disassembling the transmission. Use nylon gloves or paper towel if necessary.**
- **All removed parts must be washed. Metal parts may be washed in solvent but must be dried using compressed air after washing.**
- **Wash the clutch discs, brake discs, plastic thrust plates and rubber parts in automatic transmission fluid (ATF). Keep the washed parts away from dust.**
- **Whenever transmission parts are found damaged, the oil cooler system components must be disassembled and washed.**



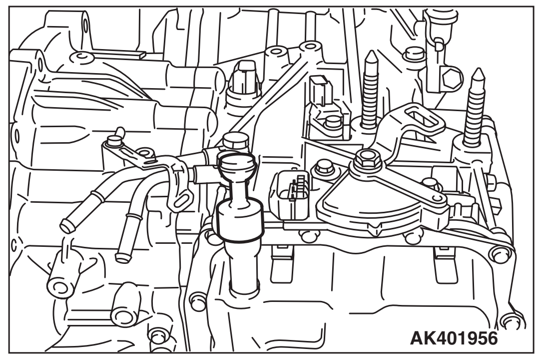
1. Remove the torque converter from the transmission.



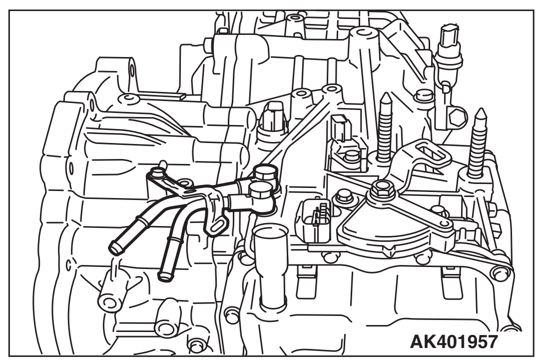
2. Remove the control cable support bracket and harness bracket from the transmission case.



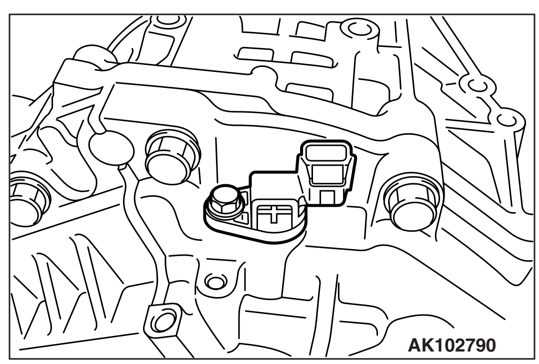
3. Remove the harness brackets at two places on the transmission case.



4. Remove the oil level gauge from the valve body cover.

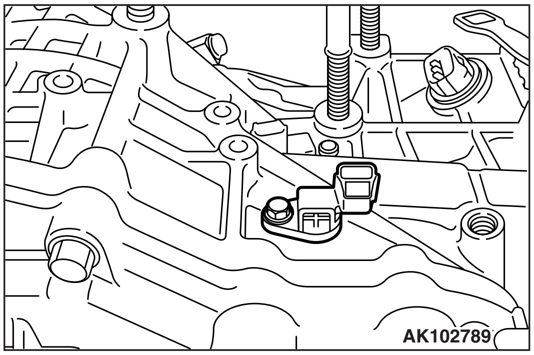


5. Remove the eyebolts (two pieces), gaskets (four pieces), and oil cooler feed tube from the transmission case.

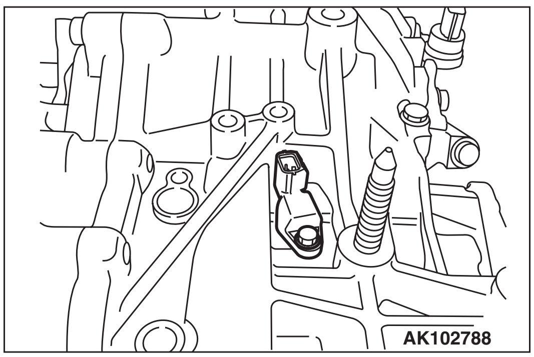


6. Remove the secondary speed sensor from the converter housing.

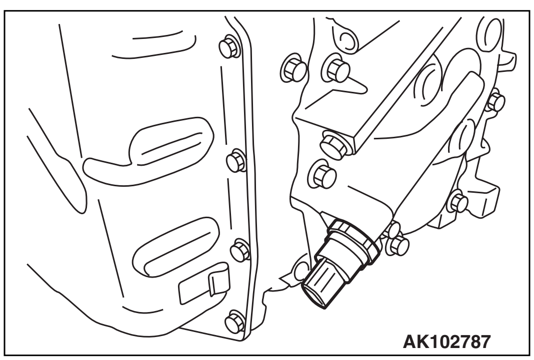
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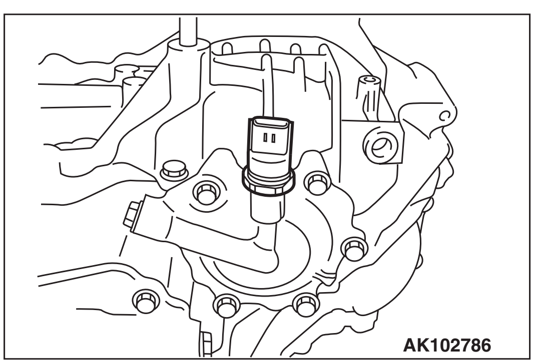
7. Remove the turbine speed sensor from the transmission case.



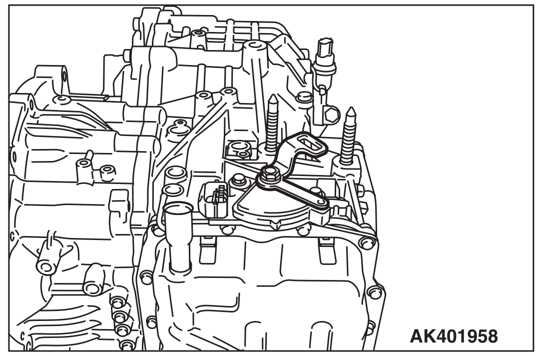
8. Remove the primary speed sensor from the transmission case.



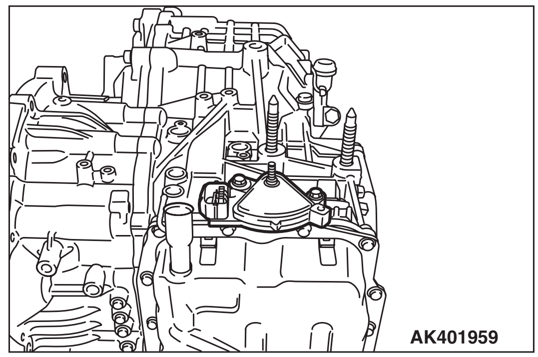
9. Remove the primary pressure sensor from the primary rear cover.



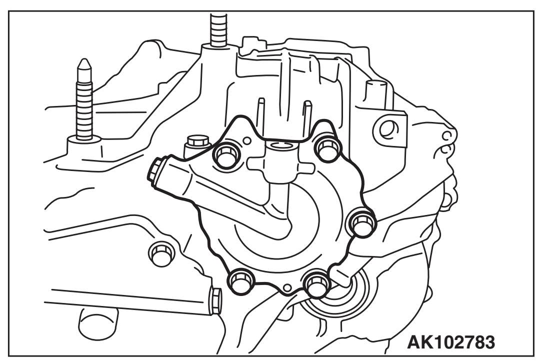
10. Remove the secondary pressure sensor from the secondary rear cover.



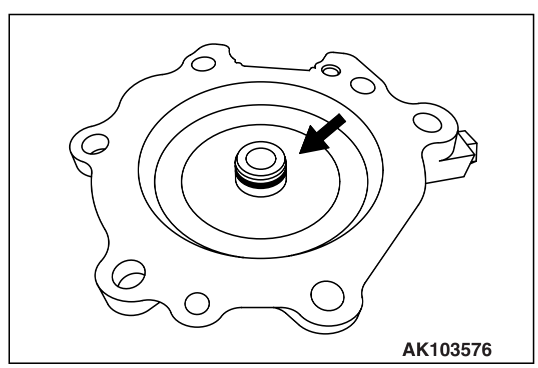
11. Remove the manual control lever from the manual control shaft.



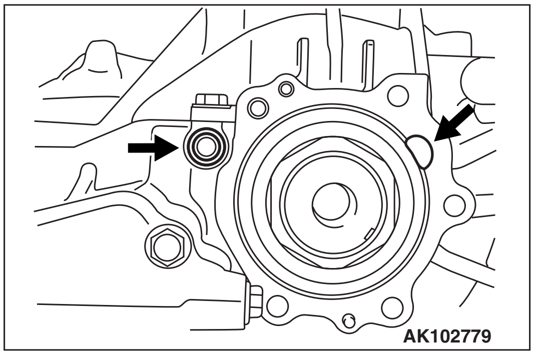
12. Remove the inhibitor switch from the transmission case.



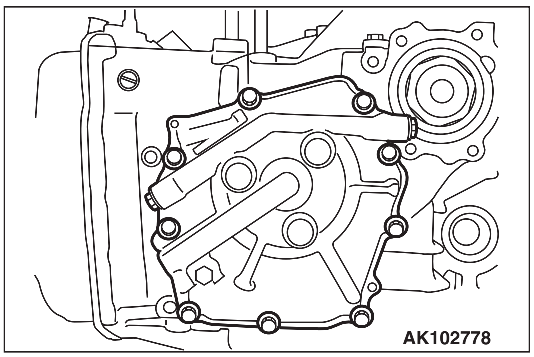
13. Remove the secondary rear cover from the transmission case.



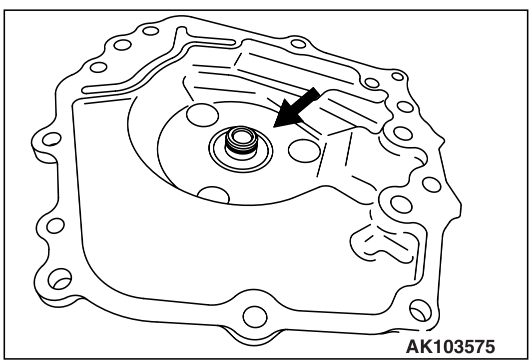
14. Remove the seal ring from the secondary rear cover.



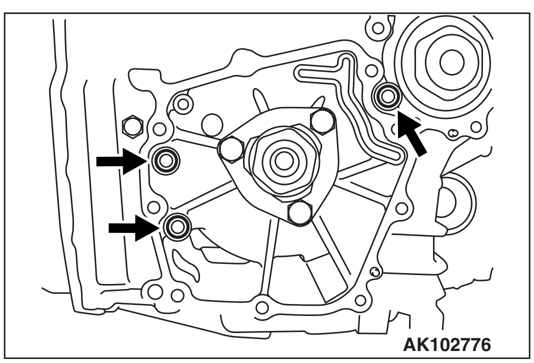
15.Remove the O-ring and stopper from the transmission case.



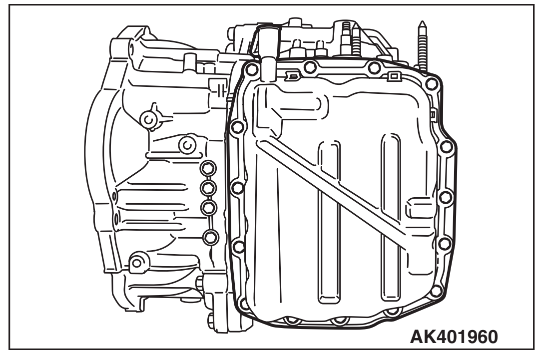
16.Remove the primary rear cover from the transmission case.



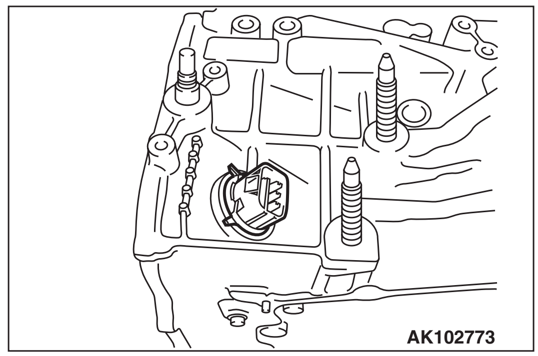
17.Remove the seal ring from the primary rear cover.



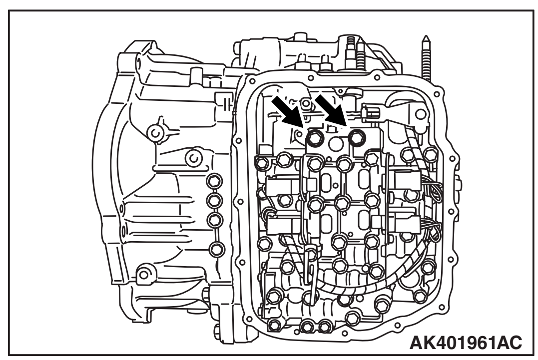
18.Remove the O-rings (three pieces) from the transmission case.



19.Remove the valve body cover from the transmission case.



20.Remove the clamp that holds the connector of solenoid valve harness.

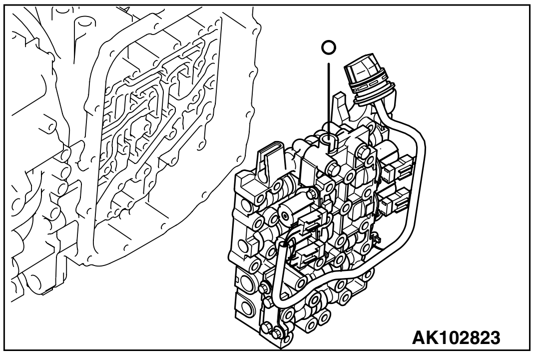


⚠ CAUTION

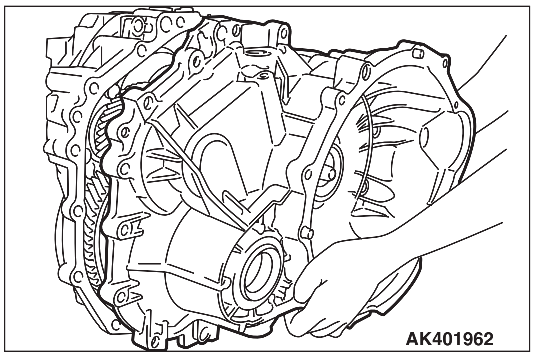
Do not remove the bolts (two pieces) shown in the illustration.

21.Remove the valve body mounting bolts (thirty four bolts other than the two shown in the illustration), then remove the valve body from the transmission case.

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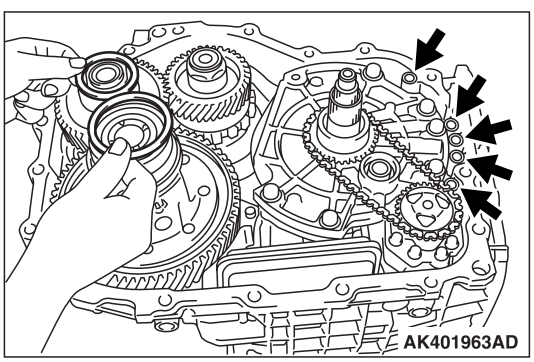
22.Remove the steel ball indicated in the illustration from the valve body.



⚠ CAUTION

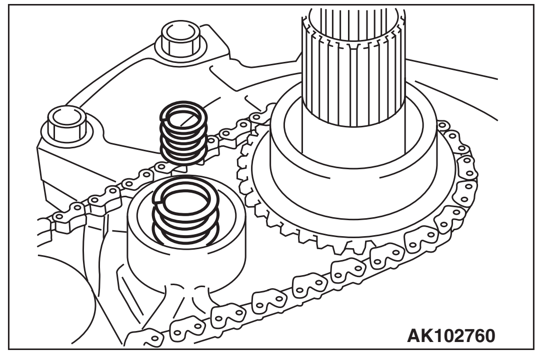
The spacer (for adjusting the differential bearing clearance), O-rings (five pieces), and accumulator springs (two pieces) may come off together with the converter housing.

23.Remove the converter housing from the transmission case.

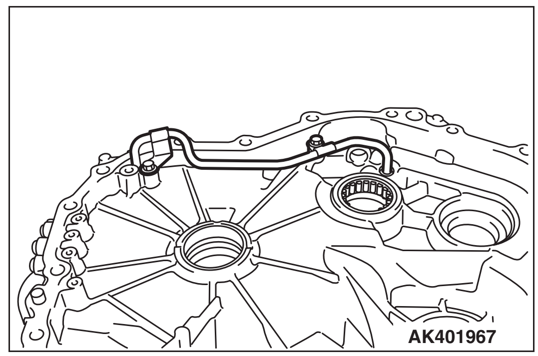


24.Remove the O-rings (five pieces) and the spacer for adjusting the differential bearing clearance (see the illustration).

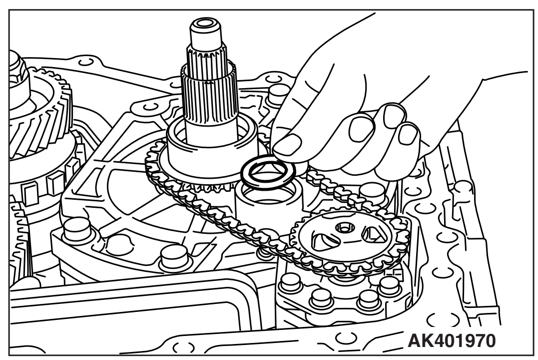
NOTE: The O-ring and spacer may attach to the converter housing which was removed in the preceding step.



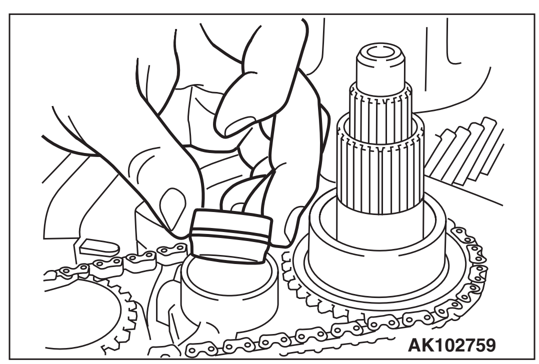
25.Remove the accumulator springs (two pieces) from the reaction shaft support.



26.Remove the oil pipe from the converter housing.

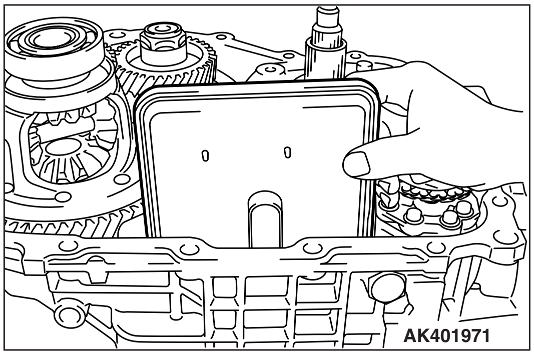


27.Remove the snap ring and stopper plate on the reaction shaft support.



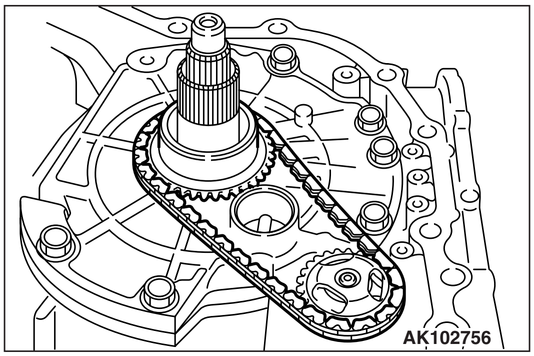
28.Remove the accumulator piston from the reaction shaft support.

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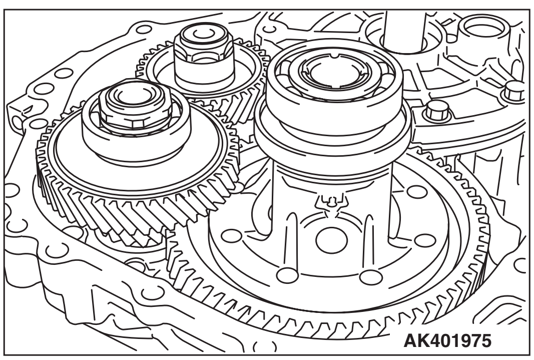
AK401971

29.Remove the oil filter from the transmission case.



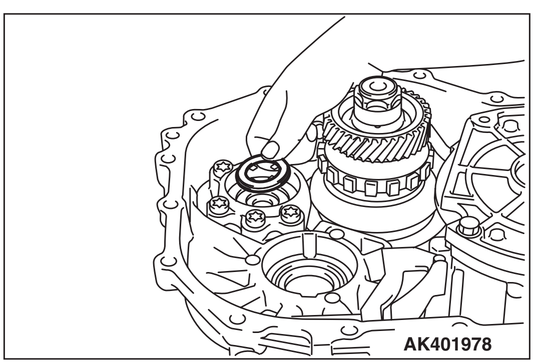
AK102756

30.Remove the chain and oil pump drive sprocket.



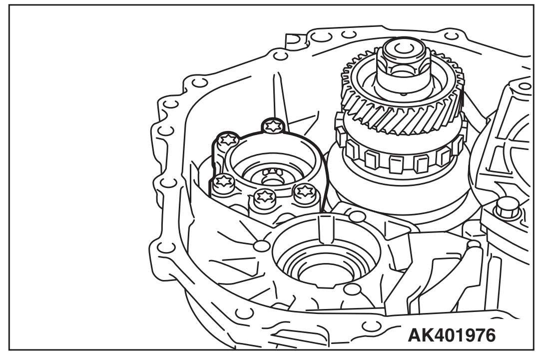
AK401975

31.Remove the output shaft and differential from the transmission case.



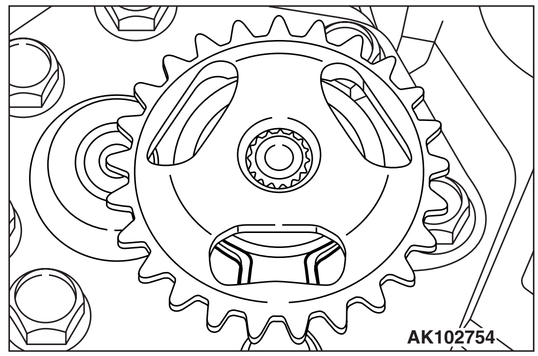
AK401978

32.Remove the thrust bearing from the bearing retainer.



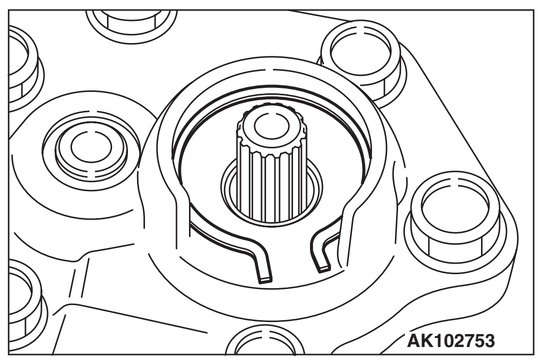
AK401976

33.Remove the output shaft bearing outer race and bearing retainer from the transmission case.



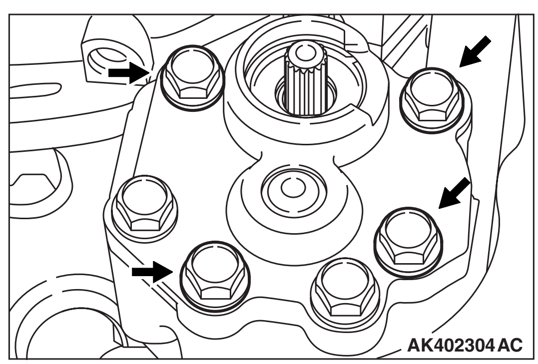
AK102754

34.Remove the oil pump driven sprocket from the oil pump by opening the snap ring shown in the illustration.



AK102753

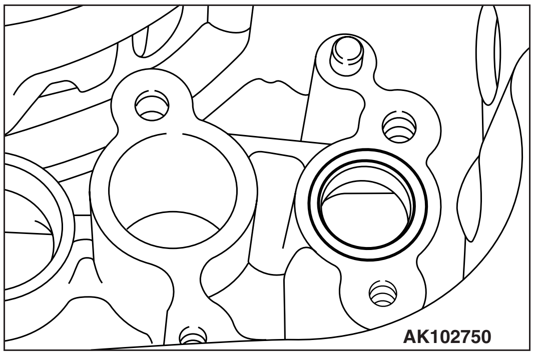
35.Detach the snap ring that retains the oil pump driven sprocket from the oil pump.



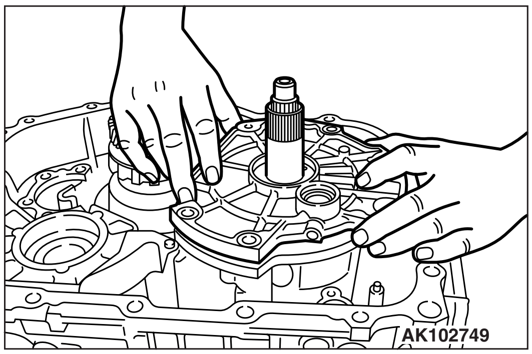
AK402304AC

36.Remove the bolts (four pieces) shown in the illustration, then remove the oil pump from the transmission case.

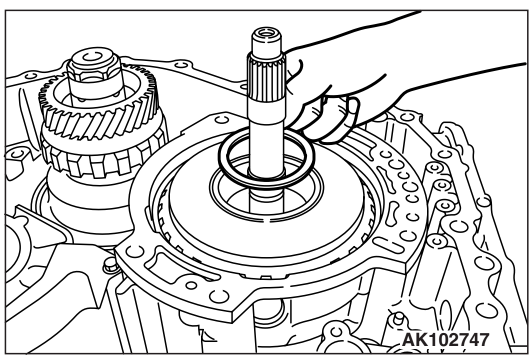
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37.Remove the O-ring shown in the illustration from the transmission case.

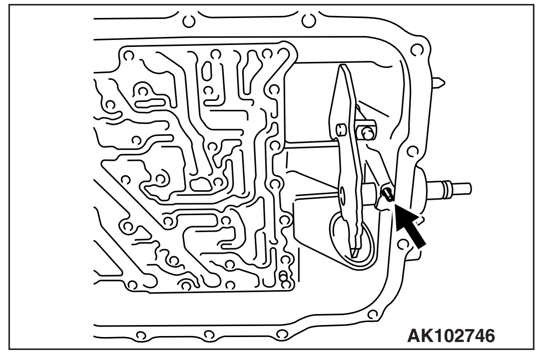


38.Remove the reaction shaft support from the transmission case.

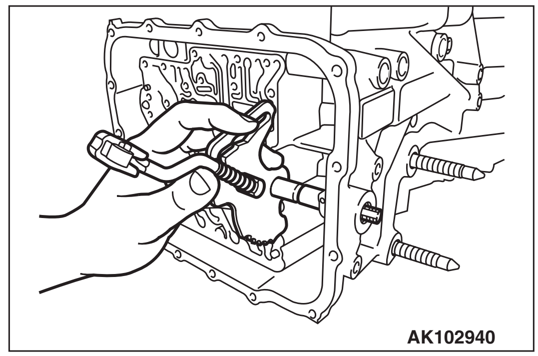


39.Remove the thrust washer from the forward clutch.

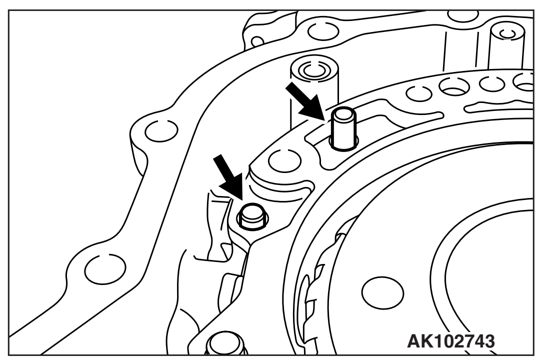
NOTE: The thrust washer may attach to the reaction shaft support which was removed in the preceding step.



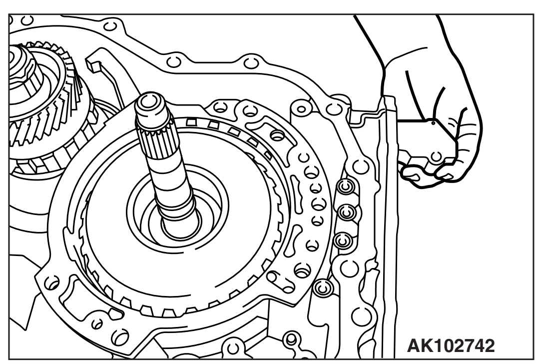
40.Remove the knock pin that is positioning the manual control shaft from the transmission case.



41.Remove the manual control shaft and parking roller rod from the transmission case.

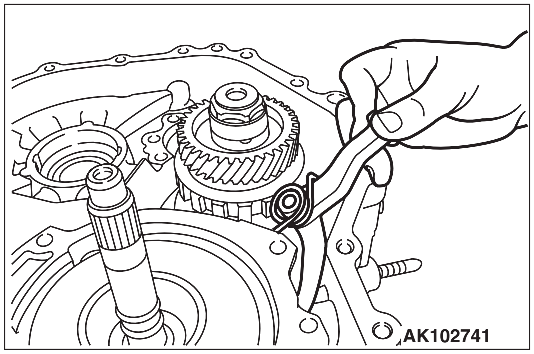


42.Remove the parking roller support shafts (two pieces) from the transmission case.

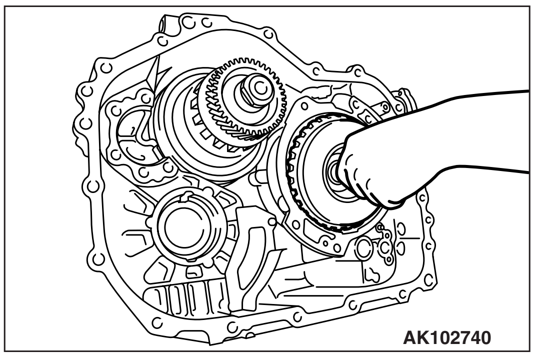


43.Remove the parking roller support from the transmission case.

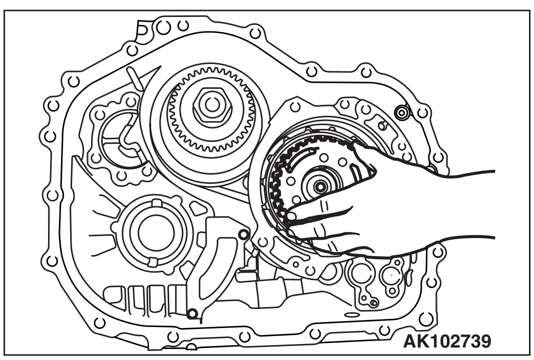
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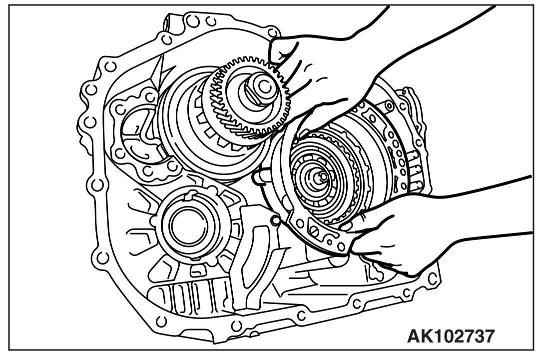
44.Remove the parking sprag shaft, then remove the parking sprag and spring from the transmission case.



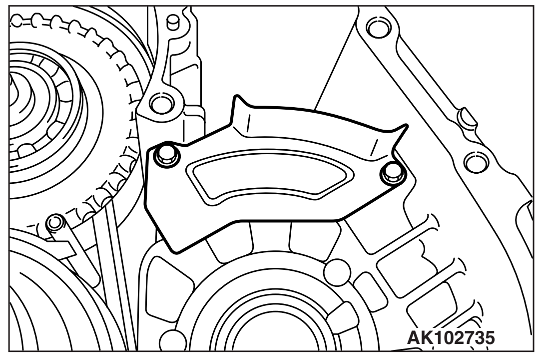
45.Remove the forward clutch and input shaft out of the transmission case.



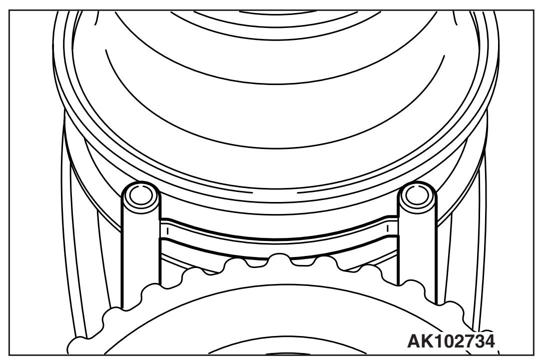
46.Remove the planetary carrier out of the transmission case.



47.Remove the reverse brake out of the transmission case.



48.Remove the oil guide from the transmission case.



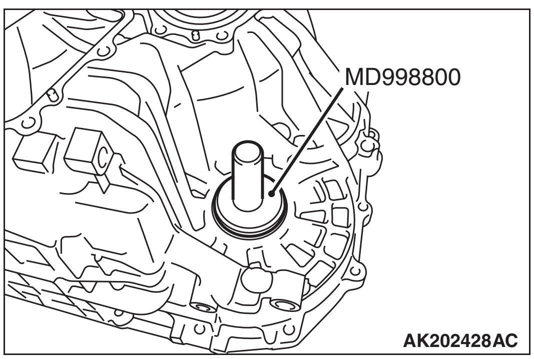
49.Remove the belt lubricating pipe out of the transmission case.

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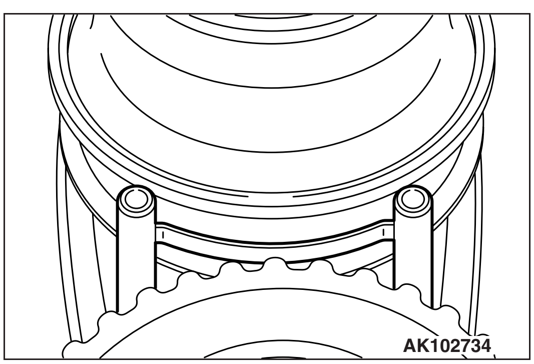
REASSEMBLY SERVICE POINTS

⚠ CAUTION

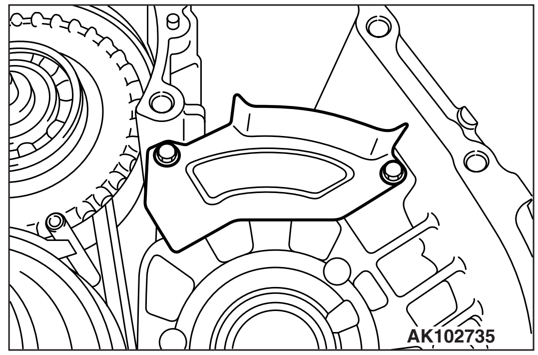
- **Do not reuse any of the removed gaskets, O-rings and oil seals. Be sure to use new gaskets, O-rings and oil seals when the transmission is reassembled.**
- **Only blue petrolatum jelly and white Vaseline may be used during assembly.**
- **The friction elements and the parts having surfaces on which other parts rotate or slide must be coated with ATF before they are assembled. New brake and clutch discs must be immersed in ATF for more than two hours before installation.**
- **Do not apply sealant and adhesive to any preformed gaskets.**
- **If a bushing requires replacement, replace the assembly which includes the bushing.**
- **Do not use cotton gloves and shop towel or rag during assembly work. Use nylon gloves and paper towel if necessary.**
- **Do not forget to change the fluid in the oil cooler.**



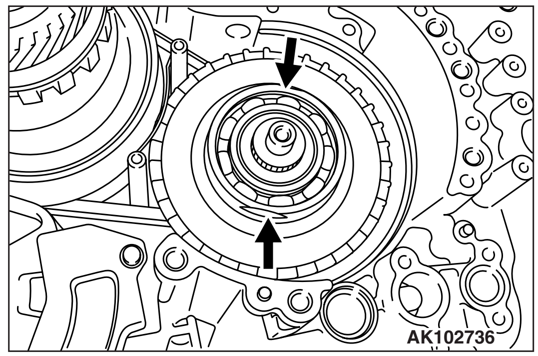
1. Install a new oil seal in the transmission case using the special tool Oil seal installer (MD998800).



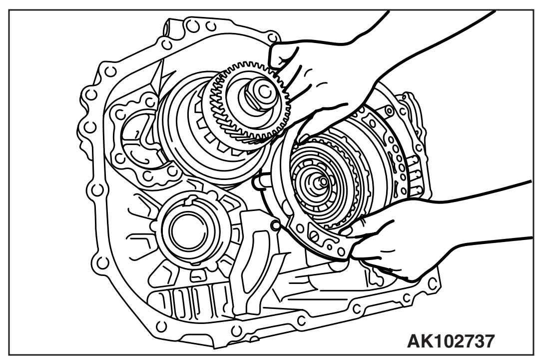
2. Install the belt libricating pipe in the transmission case.



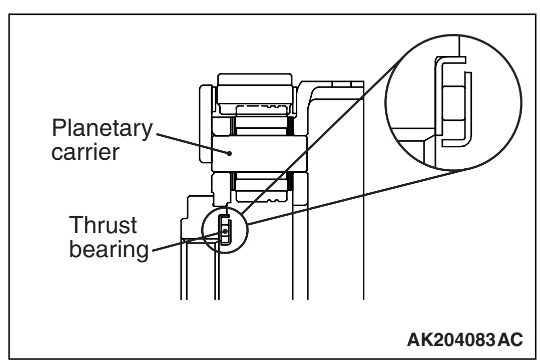
3. Install the oil guide on the transmission case.



4. Turn the flats of the reverse brake bearing to the positions indicated in the illustration.

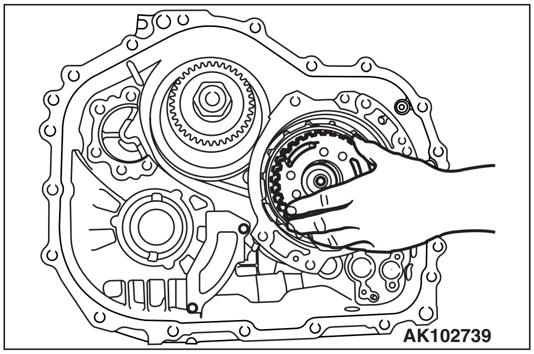


5. Install the reverse brake in the transmission case while aligning the oil pipe and knock pin positions.

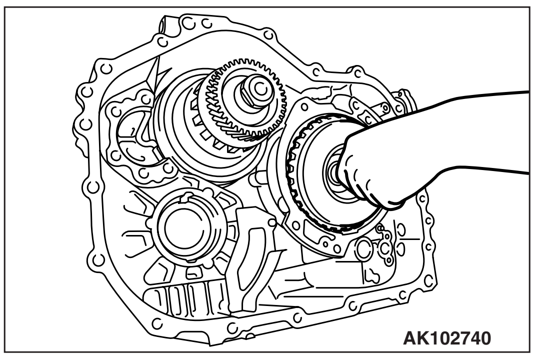


6. Install the thrust bearing into the planetary carrier in the direction shown in the illustration.

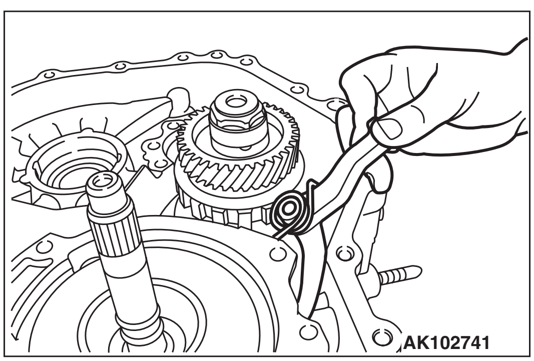
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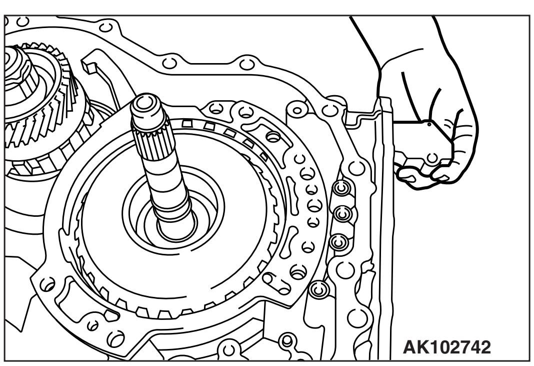
7. Install the planetary carrier in the transmission case.



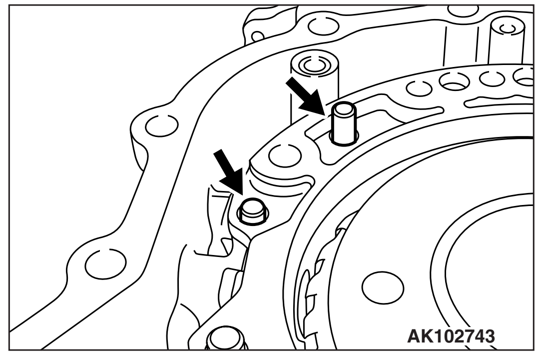
8. Install the input shaft and forward clutch in the transmission case.



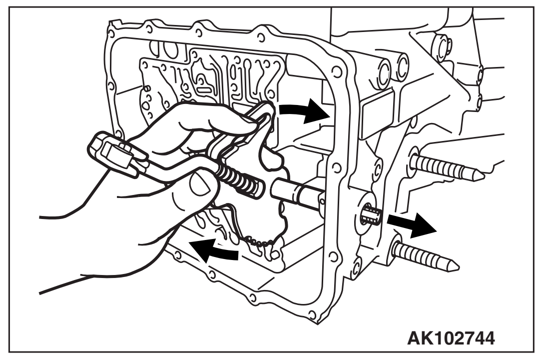
9. Install the parking sprag and spring in the transmission case, then install the parking sprag shaft.



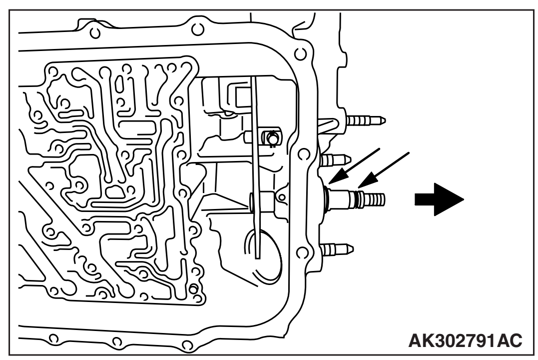
10. Install the parking roller support on the transmission case.



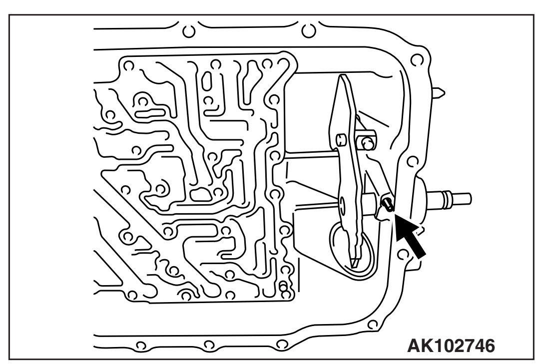
11. Install the parking roller support shafts (two pieces) in the transmission case.



12. Install the manual control shaft and parking roller rod on the transmission case.

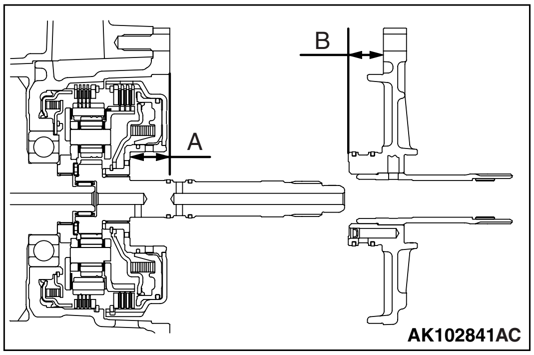


13. Push the manual control shaft in the direction indicated in the illustration, then fit the new O-rings (two pieces) in the O-ring groove.



14. Install the knock pin for positioning the manual control shaft in the transmission case.

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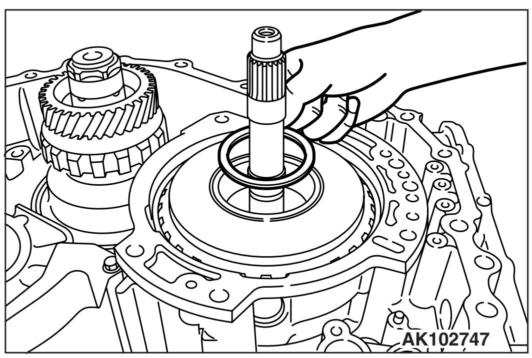


AK102841AC

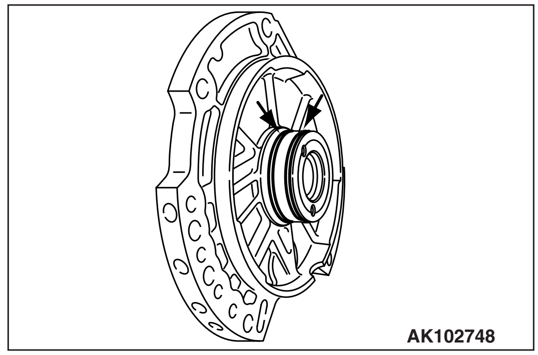
15.Measure the dimensions A and B and obtain the difference between them (A – B). Select an appropriate thrust washer according to the table below such that the end play is within the standard value range.

Standard value: 0.30 – 0.60 mm

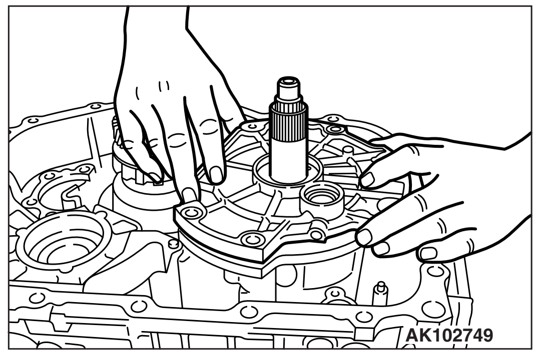
Difference between measurements (A – B) mm	Thickness mm	Identification symbol
2.15 – 2.35	1.8	18
2.35 – 2.55	2.0	20
2.55 – 2.75	2.2	22
2.75 – 2.95	2.4	24
2.95 – 3.15	2.6	26
3.15 – 3.35	2.8	28


AK102747

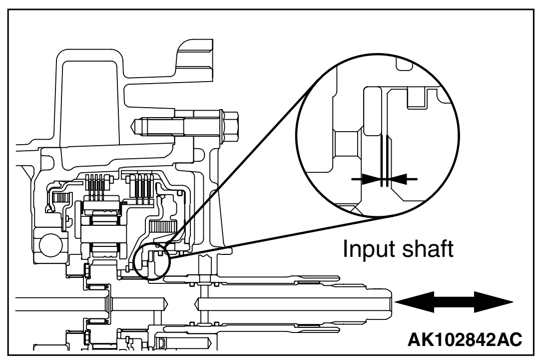
16.Install the selected thrust washer on the forward clutch.


AK102748

17.Install new seal rings on the reaction shaft support.


AK102749

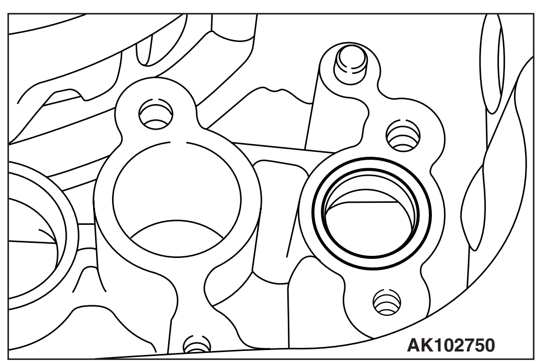
18.Install the reaction shaft support in the transmission case.



AK102842AC

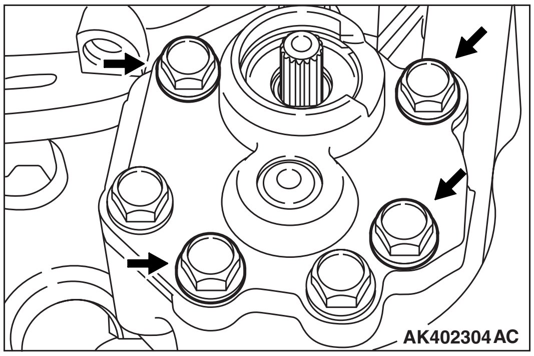
19.Make sure the end play of the input shaft is within the standard value range.

Standard value: 0.30 – 0.60 mm

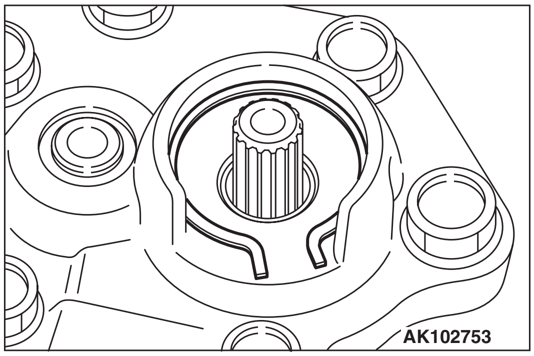

AK102750

20.Install a new O-ring in the transmission case.

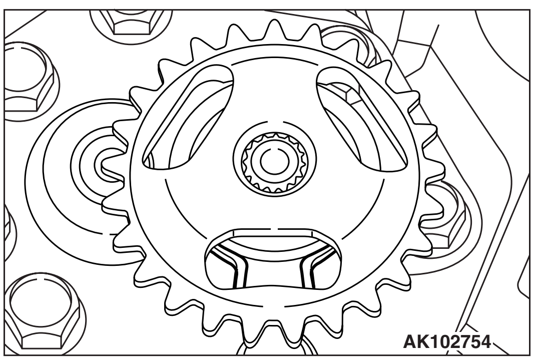
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AK402304AC

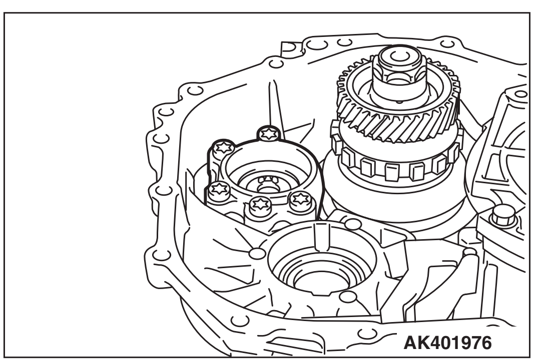
21.Install the oil pump in the transmission case.


AK102753

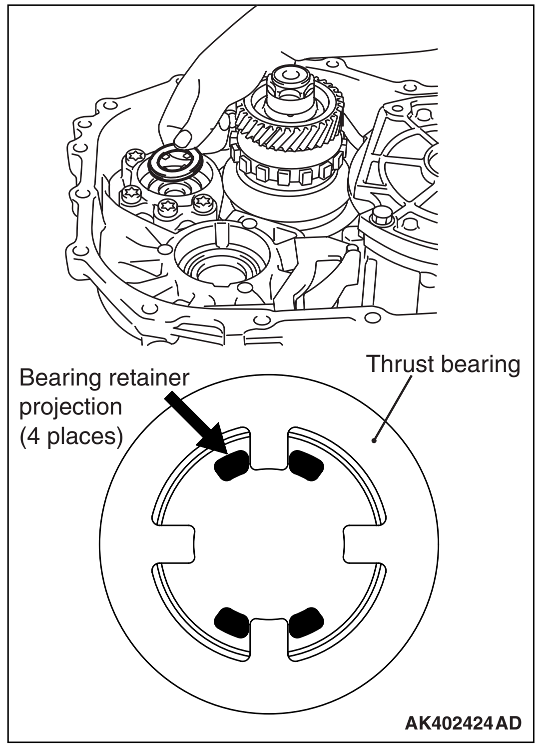
22.Install the snap ring for the oil pump driven sprocket on the oil pump.


AK102754

23.Install the oil pump driven sprocket while opening the snap ring.

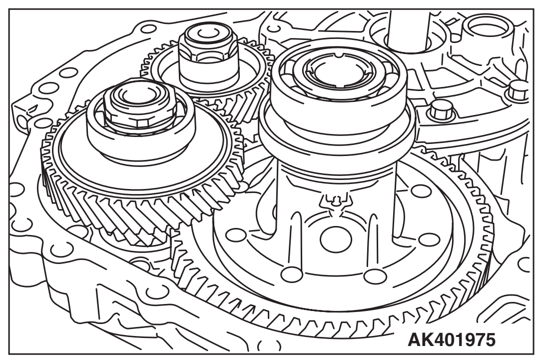

AK401976

24.Install the bearing retainer in the transmission case.

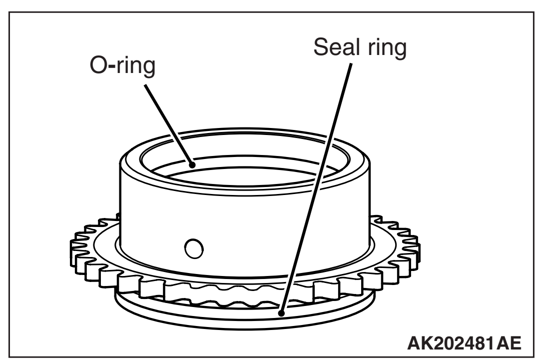


AK402424AD

25.Install the thrust bearing to the projection of the bearing retainer as shown in the illustration.


AK401975

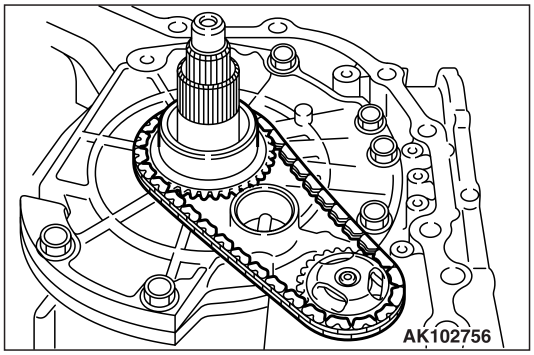
26.Install the output shaft and differential in the transmission case.



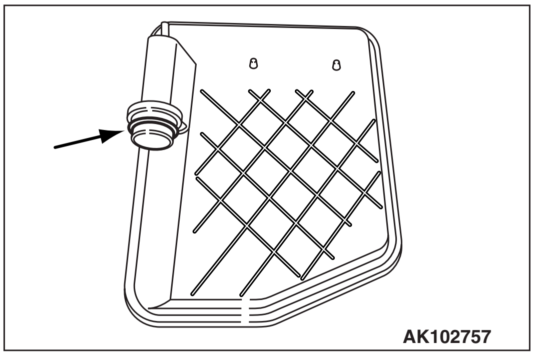
AK202481AE

27.Install new seal ring and new O-ring on the oil pump drive sprocket.

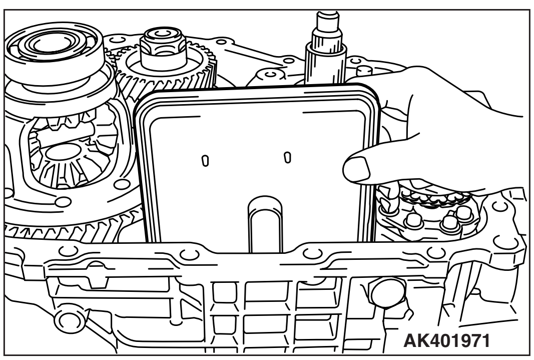
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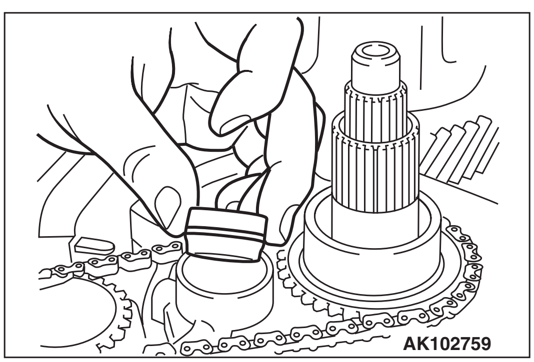
28.Install the chain and oil pump drive sprocket.



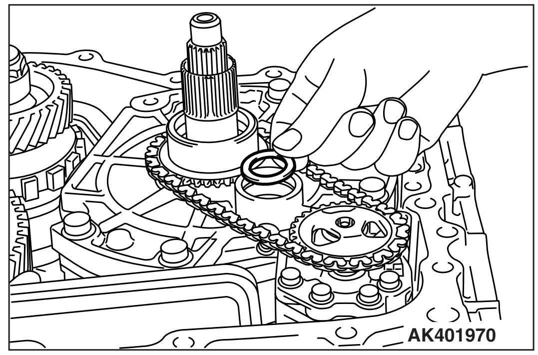
29.Fit a new O-ring on the oil filter.



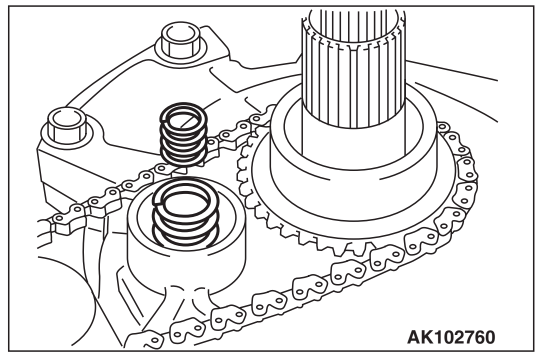
30.Install the oil filter in the transmission case.



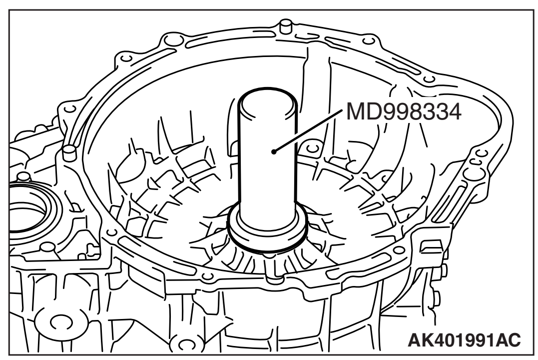
31.Fit a new seal ring on the accumulator piston, then install the piston on the reaction shaft support.



32.Install the snap ring and stopper plate on the reaction shaft support.



33.Install the accumulator springs (two pieces) on the reaction shaft support.

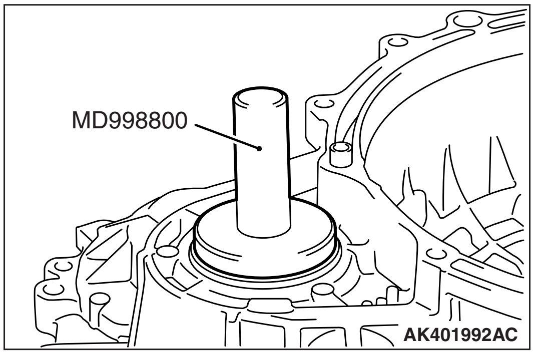


⚠ CAUTION

Install the oil seal after applying ATF to its lip.

34.Install a new oil seal in the converter housing using the special tool Oil seal installer (MD998334).

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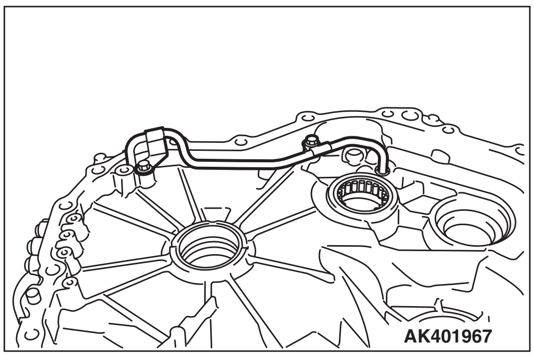


AK401992AC

⚠ CAUTION

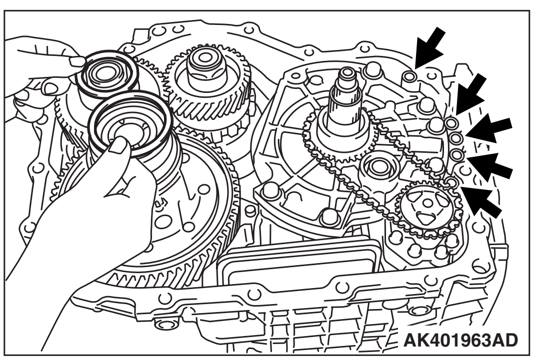
Install the oil seal after applying ATF to its lip.

35.Install a new oil seal in the converter housing using the special tool Oil seal installer (MD998800).



AK401967

36.Install the oil pipe on the converter housing.

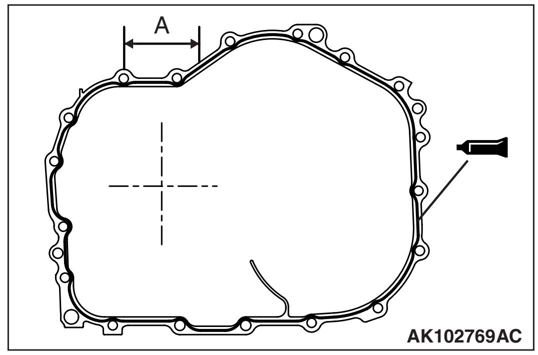


AK401963AD

37.Install the selected output shaft bearing spacer and the selected differential bearing spacer to the transmission case.

(Refer to adjustment of transmission - spacer selection for adjustment of output shaft bearing end play and differential bearing end playP.23B-29)

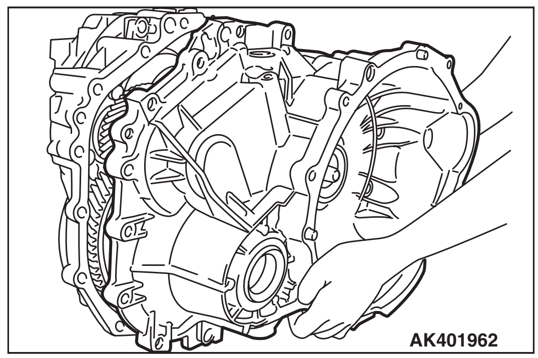
38.Install the new O-rings (five pieces) in the transmission case as shown in the illustration.



AK102769AC

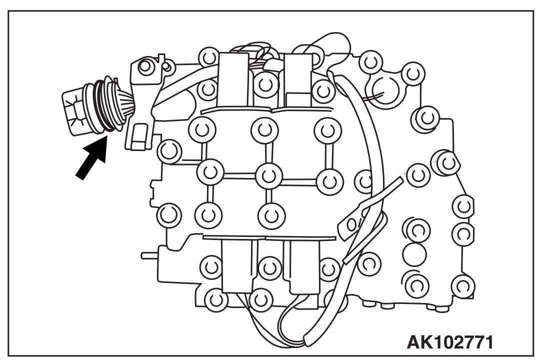
39.Apply a 1.6 mm diameter bead of liquid gasket to the converter housing as shown in the illustration, beginning with a point in zone A.

Specified sealant:
Mitsubishi genuine sealant Part No. MD974421 or equivalent



AK401962

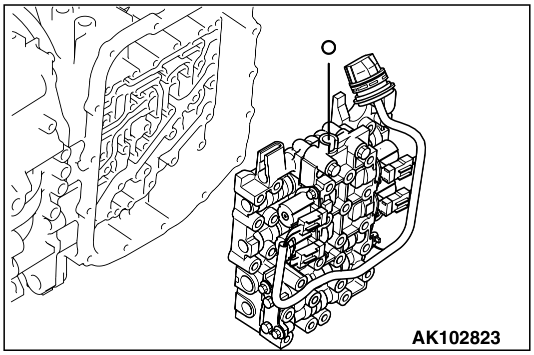
40.Install the converter housing in the transmission case.



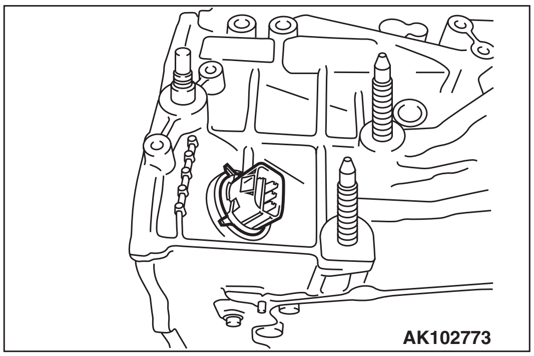
AK102771

41.Fit a new O-ring on the solenoid valve harness connector.

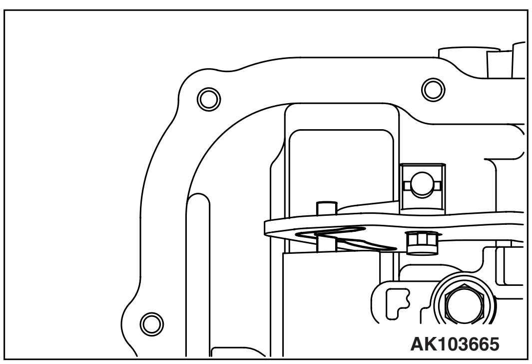
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AK102823

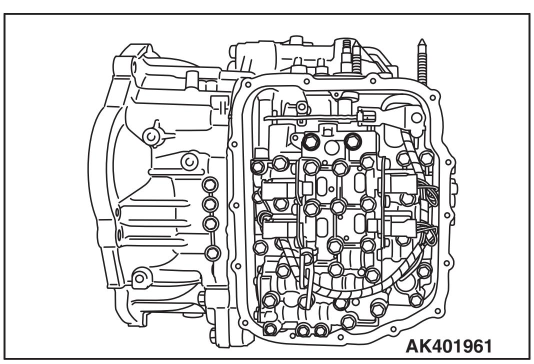
42.Install the steel ball in the indicated position of the valve body.


AK102773

43.Install the solenoid valve harness connector on the transmission case as shown in the illustration and attach the clamp to the connector.


AK103665

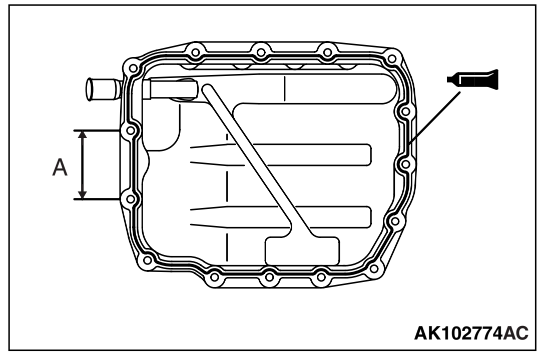
44.Insert the pin of the manual valve in the groove formed in the detent plate of the manual control lever shaft.


AK401961

⚠ CAUTION

The inside separating plate has to be replaced with a new one before the valve body is installed. Replacement of the plate involves disassembly of the valve body. (Refer to Valve Body − Disassembly and Reassembly.)

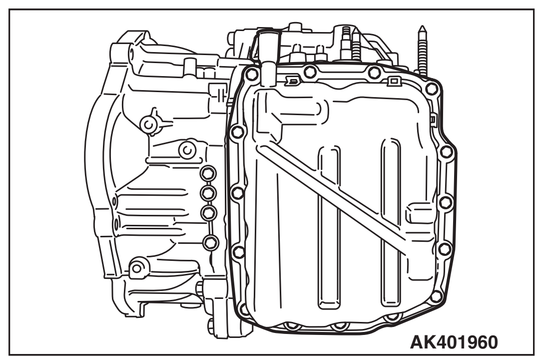
45.Install the valve body in the transmission case.



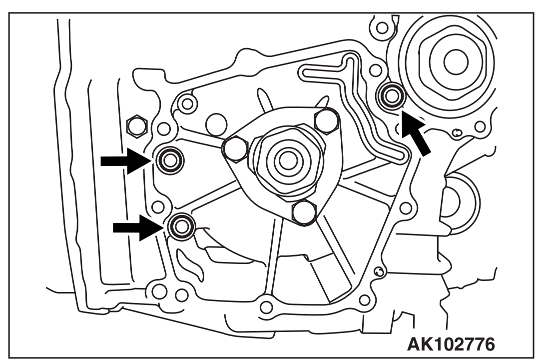
AK102774AC

46.Apply a 2.5 mm diameter bead of liquid gasket to the valve body cover, beginning with a point in zone A shown in the illustration.

Specified sealant:
Mitsubishi genuine sealant Part No. MD974421 or equivalent

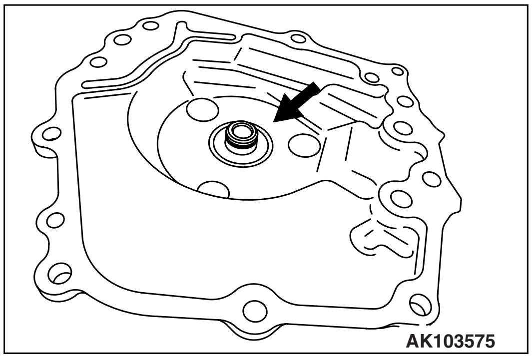

AK401960

47.Install the valve body cover on the transmission case.

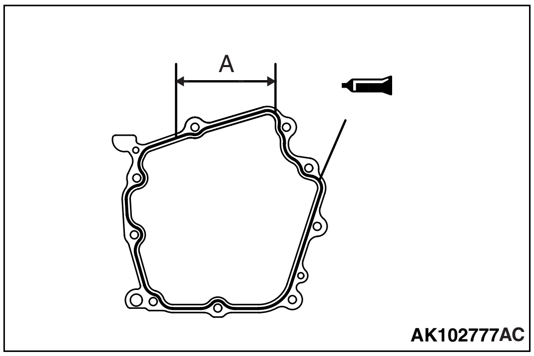

AK102776

48.Install the new O-rings (three pieces) on the transmission case.

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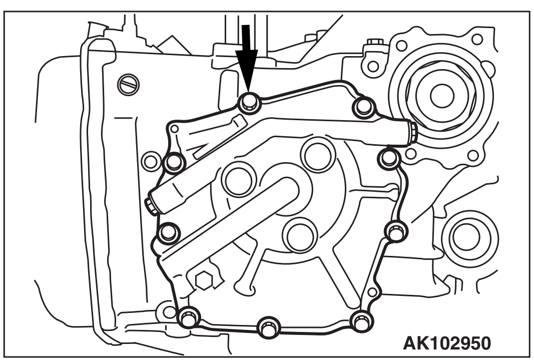


49.Install the new seal ring on the primary rear cover.



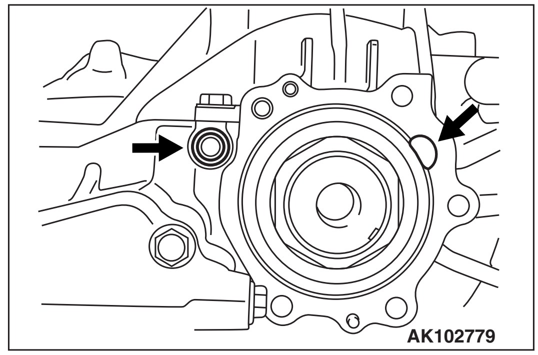
50.Apply a 1.6 mm diameter bead of liquid gasket to the primary rear cover mounting surface of the transmission case, beginning with a point in zone A shown in the illustration.

Specified sealant:
Mitsubishi genuine sealant Part No. MD974421 or equivalent

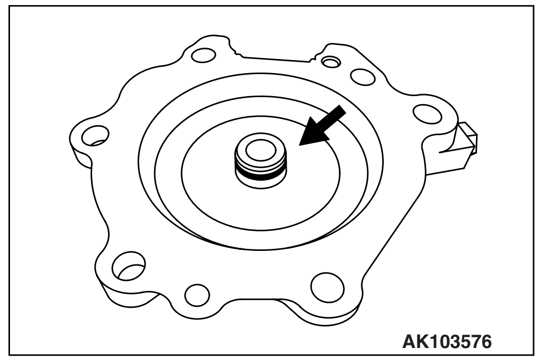


⚠ CAUTION
Replace the seal bolt shown with a new one.

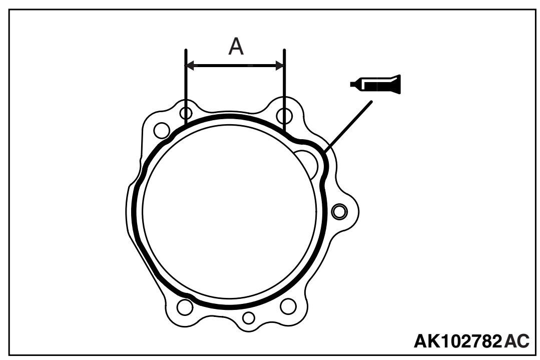
51.Install the primary rear cover on the transmission case.



52.Install a stopper and a new O-ring on the transmission case.



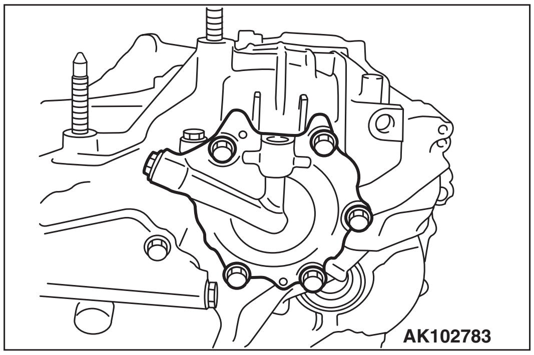
53.Install a new seal ring on the secondary rear cover.



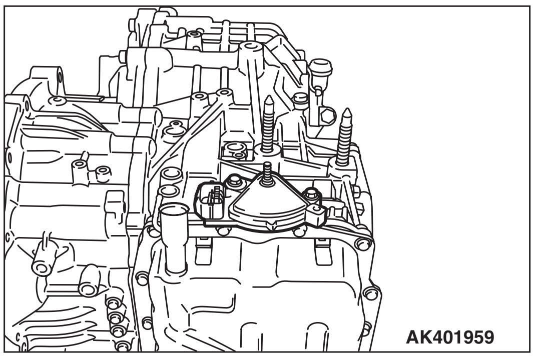
54.Apply a 1.6 mm diameter bead of liquid gasket to the secondary rear cover mounting surface of the transmission case, starting with a point within zone A shown in the illustration.

Specified sealant:
Mitsubishi genuine sealant Part No. MD974421 or equivalent

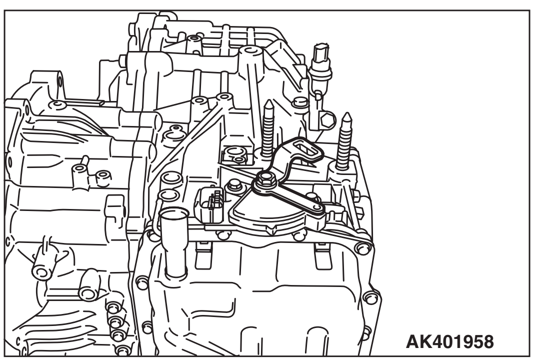
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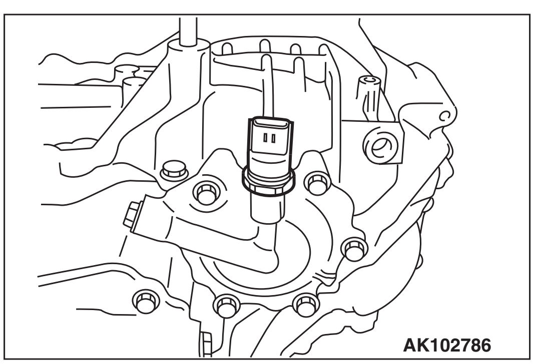
55.Install the secondary rear cover on the transmission case.



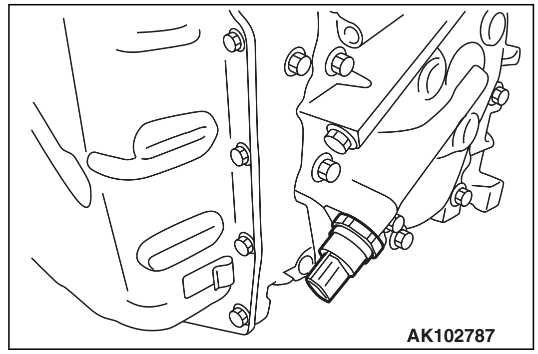
56.Install a new O-ring on the inhibitor switch and then install the inhibitor switch on the transmission case.



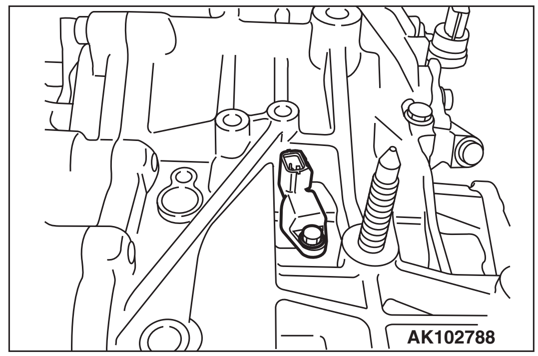
57.Install the manual control lever on the manual control shaft.



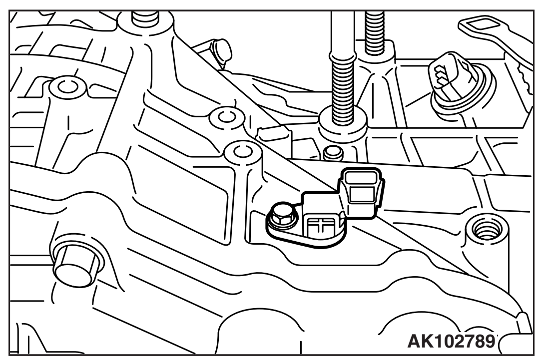
58.Install a new O-ring on the secondary pressure sensor and then install the sensor on the secondary rear cover.



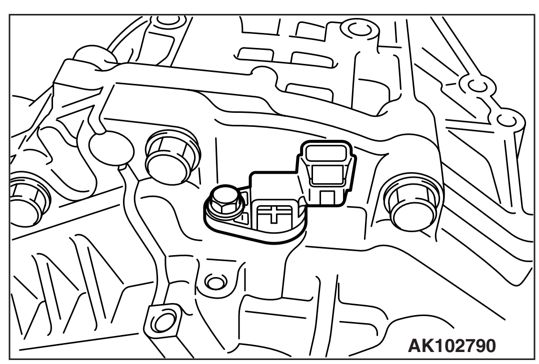
59.Install a new O-ring on the primary pressure sensor and then install the sensor on the primary rear cover.



60.Install a new O-ring on the primary speed sensor and then install the sensor on the transmission case.

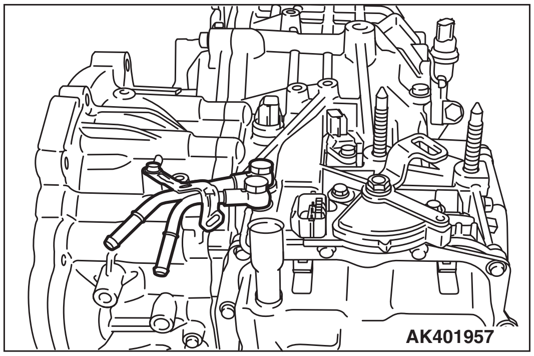


61.Install a new O-ring on the turbine speed sensor and then install the sensor on the transmission case.

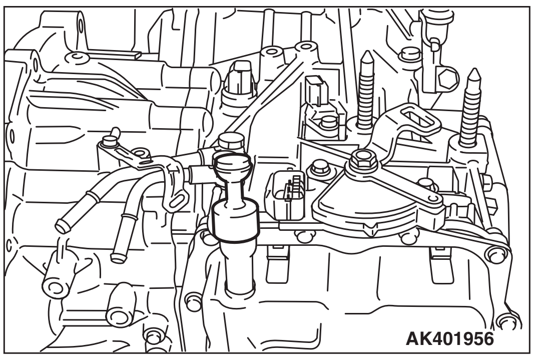


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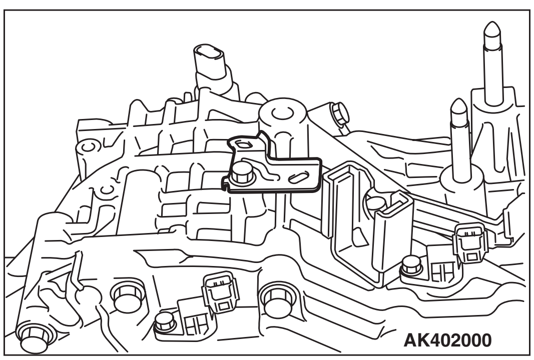
62.Install a new O-ring on the secondary speed sensor and then install the sensor on the converter housing.


AK401957

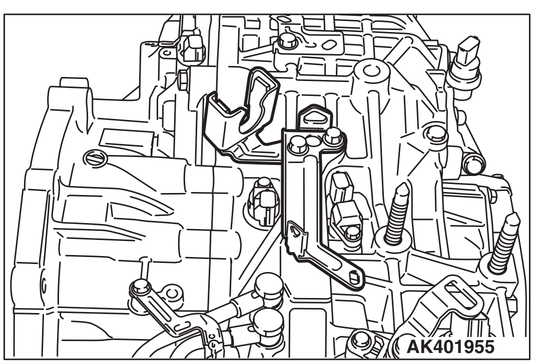
63.Install the new gaskets (four pieces), the eyebolts (two pieces) and the oil cooler feed tube on the transmission case.


AK401956

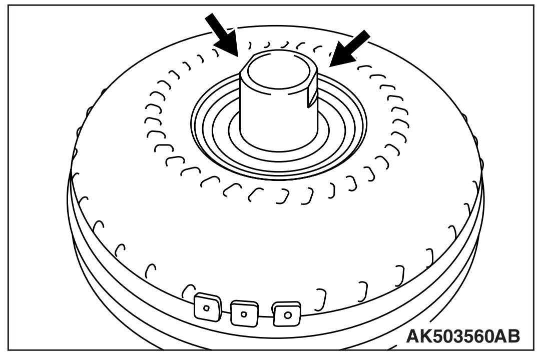
64.Install the oil level gauge on the valve body cover.

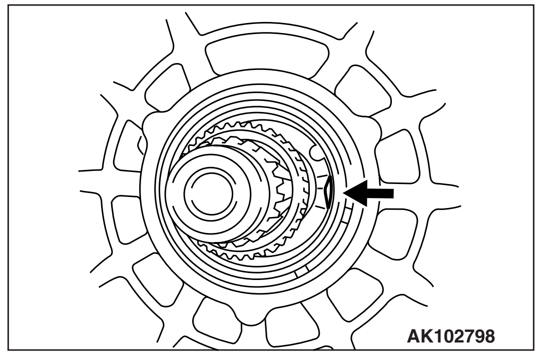

AK402000

65.Install the harness brackets (two pieces) on the transmission case.

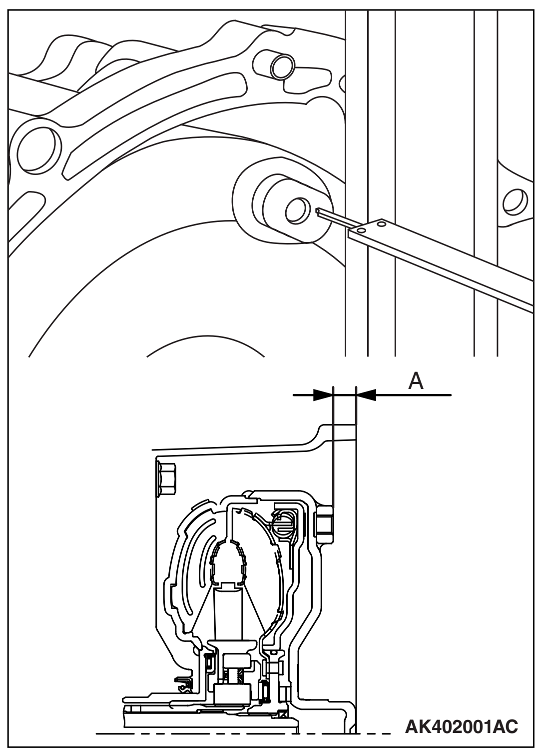

AK401955

66.Install the control cable support bracket and harness bracket on the transmission case.


AK503560AB


AK102798

67.Install the torque converter on the transmission while aligning the flats on the torque converter with those in the oil pump drive sprocket.



AK402001AC

68.Measure dimension A indicated in the illustration. The measurement should be equal to the reference value shown below. If necessary push the torque converter further into the transmission.

Reference value: 12.2 mm

ADJUSTMENT OF TRANSMISSION

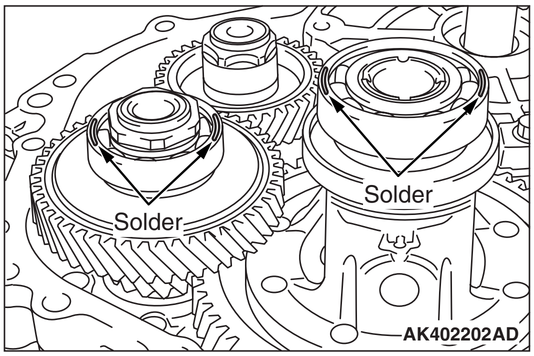
M1233030400140

SPEACER SELECTION FOR ADJUSTMENT OF OUTPUT SHAFT BEARING END PLAY AND DIFFERENTIAL BEARING END PLAY

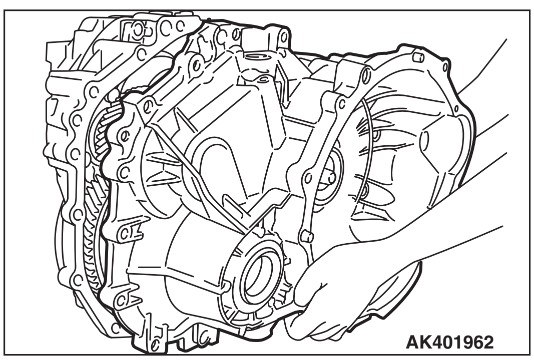
<Measurement using Solder>

⚠ CAUTION

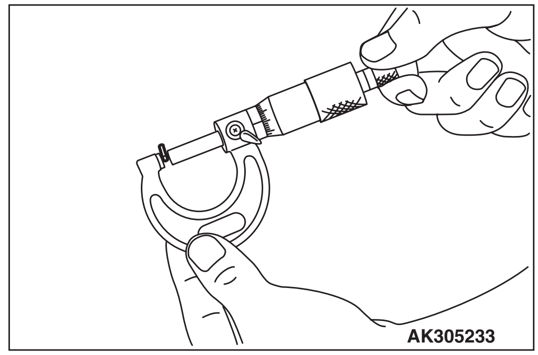
- **If the solder is not available, select the spacer in accordance with Plastigage method.**
- **If the spacer appropriate for the standard value cannot be selected using the solder, select the spacer in accordance with Plastigage method.**



1. Place two pieces of solder (1.0 mm diameter, about 10 mm long) in the shown locations of the output shaft ball bearing and the differential ball bearing.



2. Install the converter housing on the transmission case without applying FIPG. Tighten the mounting bolts to the specified torque of 48 ± 6 N·m.
3. Remove the converter housing from the transmission case and take out the solder pieces for obtaining the differential bearing end play.
4. Remove the bearing outer race from the converter housing and take out the solder pieces for obtaining the output shaft bearing preload.
5. If the solders have not crushed, use thicker solders (1.6 mm diameter, about 10 mm long) and repeat steps 2 to 4.



6. Measure the thickness of the crushed solder pieces using a micrometer. Based on the results, select spacers which adjust the end play and preload to the following standard values, respectively, according to the tables below.

Standard value:
Output shaft bearing end play
0.045 – 0.165 mm
Differential bearing end play
0.045 – 0.165 mm

Output shaft bearing spacer

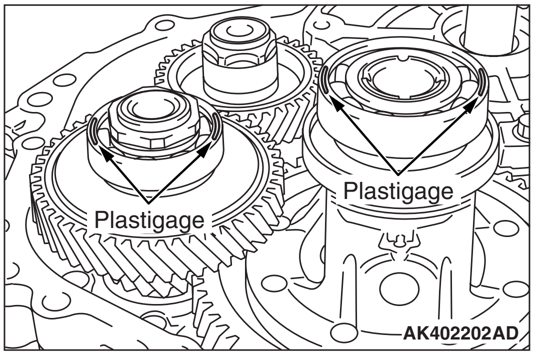
Measurement mm	Thickness mm	Identification symbol
1.34 – 1.43	1.28	28
1.43 – 1.52	1.37	37
1.52 – 1.61	1.46	46
1.61 – 1.70	1.55	55
1.70 –1.79	1.64	64
1.79 –1.88	1.73	73
1.88 –1.97	1.82	82

Differential bearing spacer

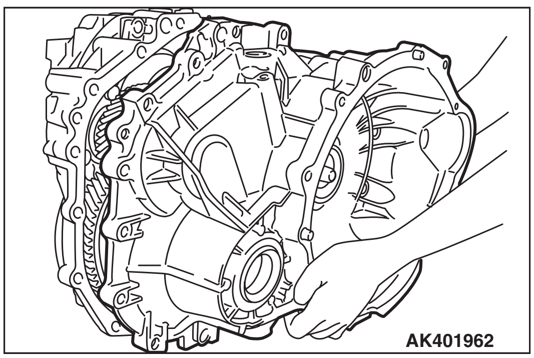
Measurement mm	Thickness mm	Identification symbol
1.16 – 1.25	1.10	J
1.25 – 1.34	1.19	L
1.34 – 1.43	1.28	N
1.43 – 1.52	1.37	P
1.52 – 1.61	1.46	R
1.61 – 1.70	1.55	T
1.70 – 1.79	1.64	V
1.79 – 1.88	1.73	X
1.88 – 1.97	1.82	Z

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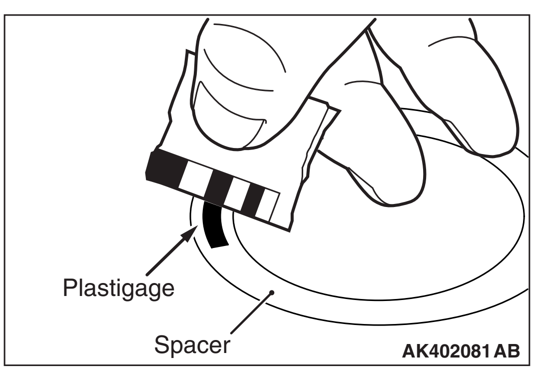
<Measurement using Plastigage>



1. Place two pieces of plastigage (about 10 mm long) in the shown locations of the output shaft ball bearing and the differential ball bearing.
2. Install the adjusting spacer having minimum thickness.



3. Install the converter housing on the transmission case without applying FIPG. Tighten the mounting bolts to the specified torque of 48 ± 6 N·m.
4. Remove the converter housing from the transmission case and take out the plastigage pieces for obtaining the differential bearing end play.
5. Remove the bearing outer race from the converter housing and take out the plastigage pieces for obtaining the output shaft bearing preload.
6. If the plastigages have not crushed, use thicker adjusting spacer and repeat steps 3 to 5.



7. Measure the width of the each crushed plastigage at its widest part using a scale printed on the plastigage package and record the each measured value. Based on the results which calculated by the following formula, select spacers which adjust the end play and preload to the following standard values, respectively, according to the tables below.

T = T1 + T2
T: Clearance mm
T1: The crushed plastigage thickness mm
T2: The adjusting spacer thickness used for measurement mm

Standard value:
Output shaft bearing end play
0.045 – 0.165 mm
Differential bearing end play
0.045 – 0.165 mm

Output shaft bearing spacer

Measurement mm	Thickness mm	Identification symbol
1.34 – 1.43	1.28	28
1.43 – 1.52	1.37	37
1.52 – 1.61	1.46	46
1.61 – 1.70	1.55	55
1.70 –1.79	1.64	64
1.79 –1.88	1.73	73
1.88 –1.97	1.82	82

Differential bearing spacer

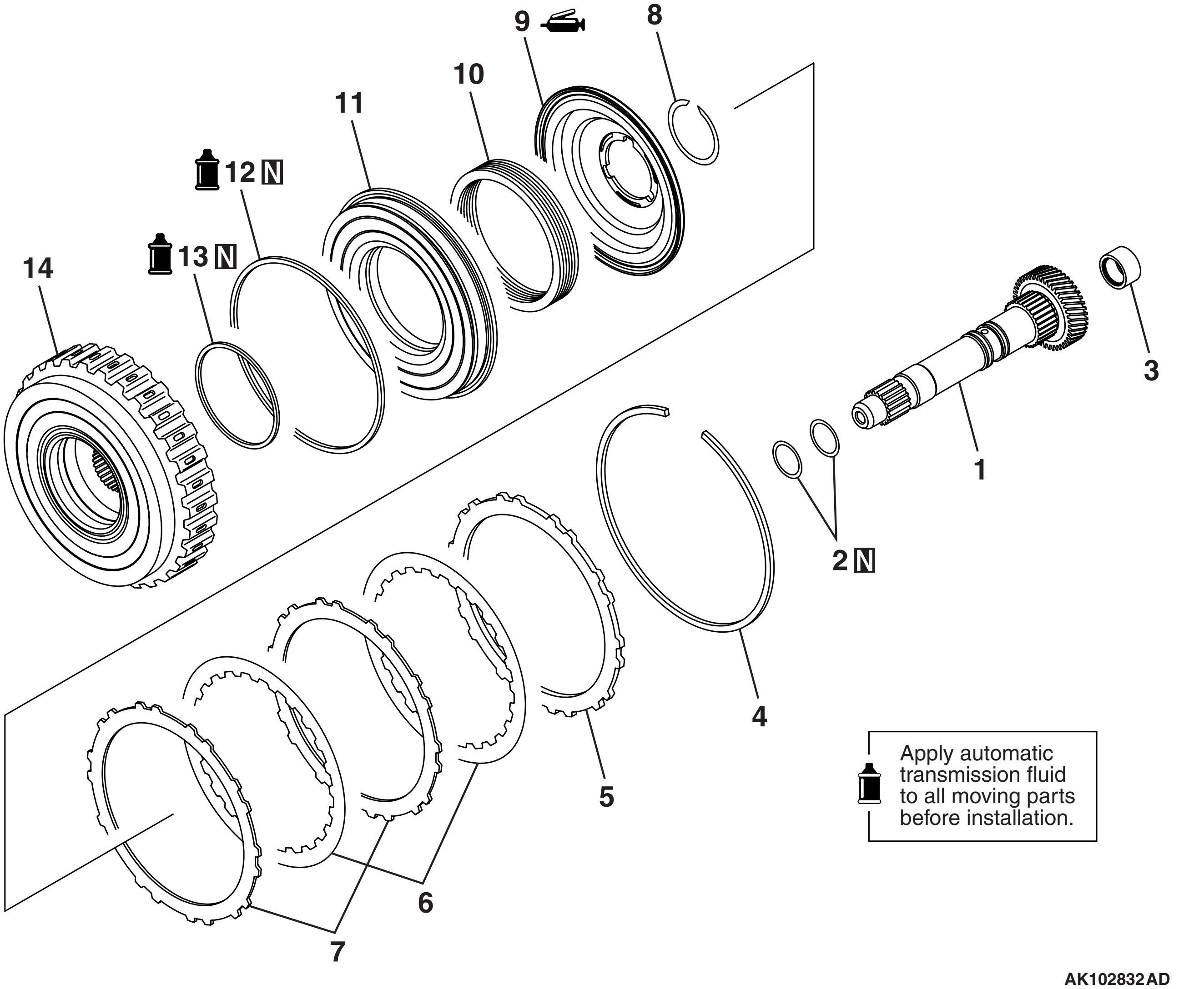
Measurement mm	Thickness mm	Identification symbol
1.16 – 1.25	1.10	J
1.25 – 1.34	1.19	L
1.34 – 1.43	1.28	N
1.43 – 1.52	1.37	P
1.52 – 1.61	1.46	R
1.61 – 1.70	1.55	T
1.70 – 1.79	1.64	V
1.79 – 1.88	1.73	X
1.88 – 1.97	1.82	Z

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FORWARD CLUTCH

DISASSEMBLY AND REASSEMBLY

M1233209000117



Disassembly steps

	1.	Input shaft
	2.	Seal ring
>>**E**<<	3.	Bearing
>>**D**<<	4.	Snap ring
>>**C**<<	5.	Forward clutch reaction plate
>>**C**<<	6.	Forward clutch disc
>>**C**<<	7.	Forward clutch plate

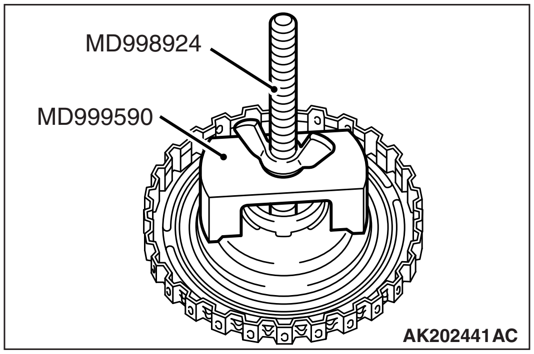
Disassembly steps (Continued)

<<**A**>>	>>**B**<<	8.	Snap ring
		9.	Spring retainer
		10.	Return spring
		11.	Clutch piston
	>>**A**<<	12.	D-ring
	>>**A**<<	13.	D-ring
		14.	Clutch retainer

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DISASSEMBLY SERVICE POINT

<<A>> SNAP RING REMOVAL

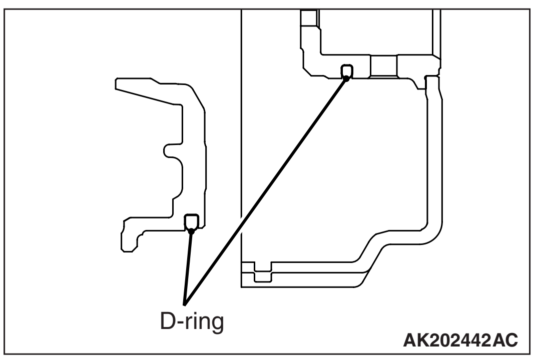


To remove the snap ring, compress the return spring by holding down the spring retainer using the special tools.

- Spring compressor retainer (MD998924)
- Spring compressor (MD999590)

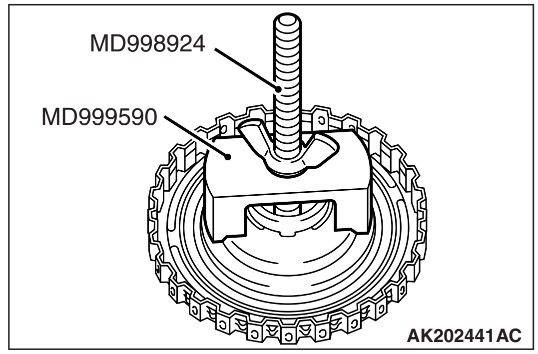
REASSEMBLY SERVICE POINTS

>>A<< D-RING INSTALLATION



Fit new D-rings into the illustrated locations. Coat them with ATF, blue petrolatum or white vaseline, then install the clutch piston in the clutch retainer while taking care not to give damage to the D-rings.

>>B<< SNAP RING INSTALLATION

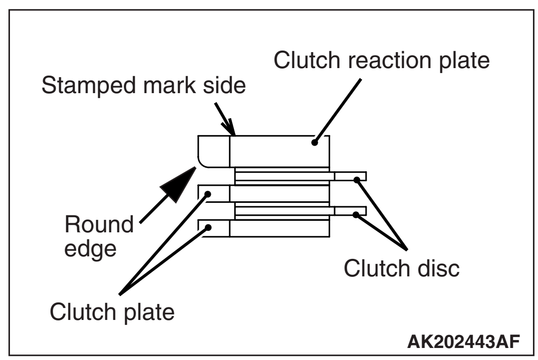


⚠ CAUTION

Do not use ATF or white vaseline.

1. Coat the lip seal of the spring retainer with blue petrolatum.
2. To install the snap ring, compress the return spring by holding down the spring retainer using the special tools.
   - Spring compressor retainer (MD998924)
   - Spring compressor (MD999590)

>>C<< CLUTCH PLATES/CLUTCH DISCS/CLUTCH REACTION PLATE INSTALLATION



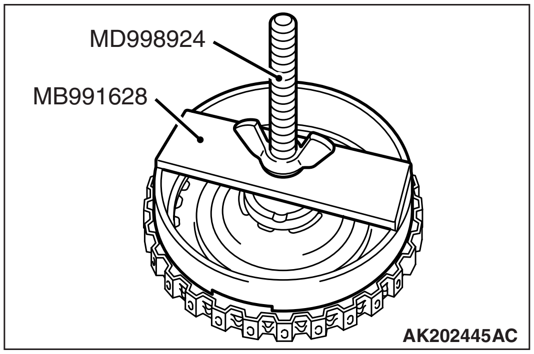
⚠ CAUTION

Immerse the clutch discs in ATF before assembling them with the other parts.

Install the clutch plates, clutch discs, and reaction plate, directing their ends as shown in the illustration.

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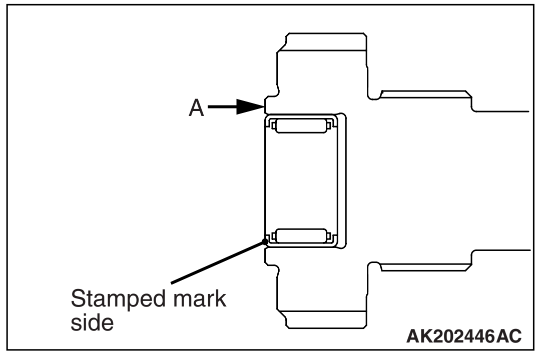
>>D<< SNAP RING INSTALLATION



1. Fit the snap ring in the snap ring groove of the forward clutch retainer.
2. Press all around the clutch reaction plate using the special tools.
   - Spring compressor retainer (MD998924)
   - Spring compressor (MB991628)
3. Check whether the clearance between the snap ring and clutch reaction plate conforms to the standard value.
4. If the clearance deviates from the standard value, adjust it by changing the snap ring to a one of an appropriate size.

   Standard value: 1.2 – 1.4 mm

>>E<< BEARING INSTALLATION



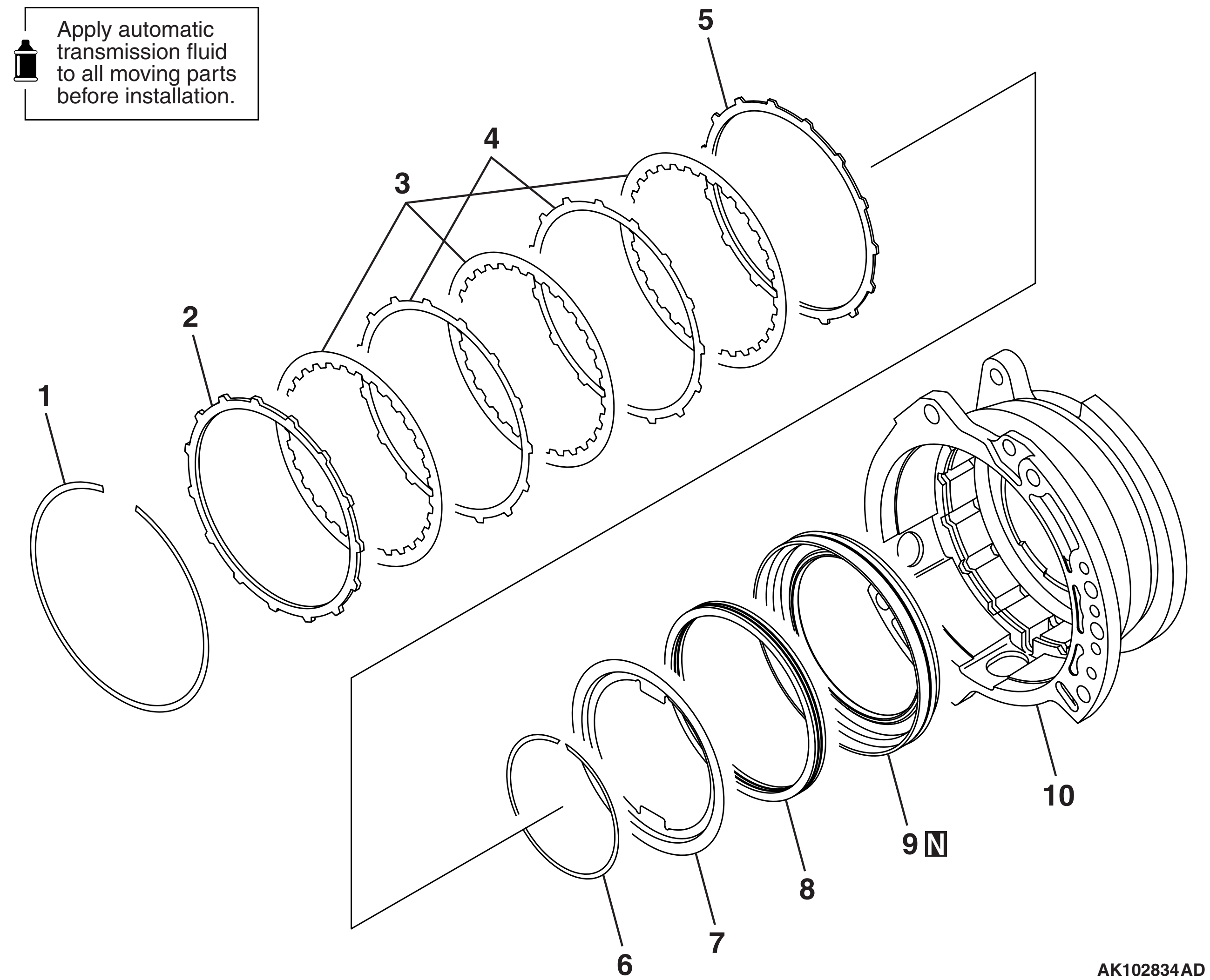
Press fit the bearing until its stamped mark surface becomes flush with the surface A shown.

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REVERSE BRAKE

DISASSEMBLY AND REASSEMBLY

M1233210000092

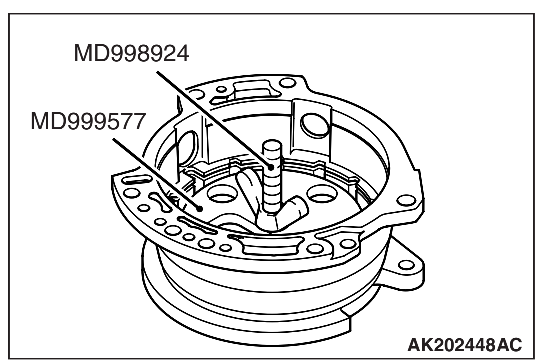


Disassembly steps

	>>D<<	1.	Snap ring
	>>C<<	2.	Brake reaction plate
	>>C<<	3.	Brake disc
	>>C<<	4.	Brake plate
		5.	Brake pressure plate
<<A>>	>>B<<	6.	Snap ring
		7.	Spring retainer
		8.	Return spring
	>>A<<	9.	Brake piston
		10.	Brake retainer

DISASSEMBLY SERVICE POINT

<<A>> SNAP RING REMOVAL



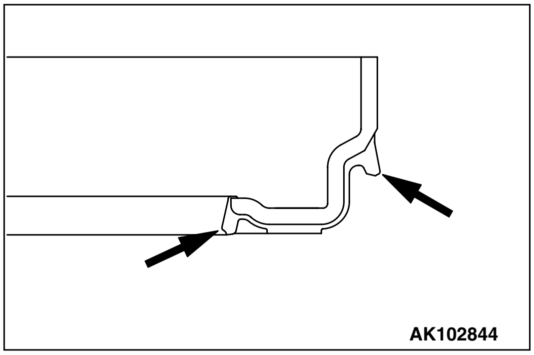
To remove the snap ring, compress the return spring by holding down the spring retainer using the indicated special tools.

- Spring compressor retainer (MD998924)
- Spring compressor (MD999577)

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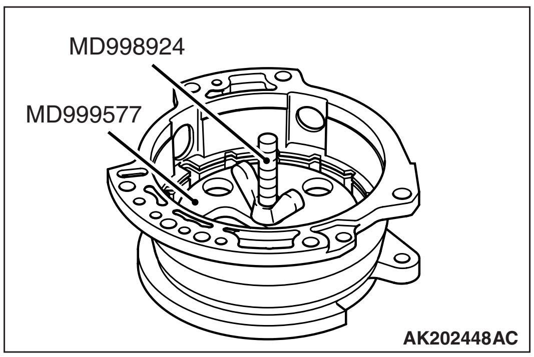
REASSEMBLY SERVICE POINTS

>>A<< BRAKE PISTON INSTALLATION

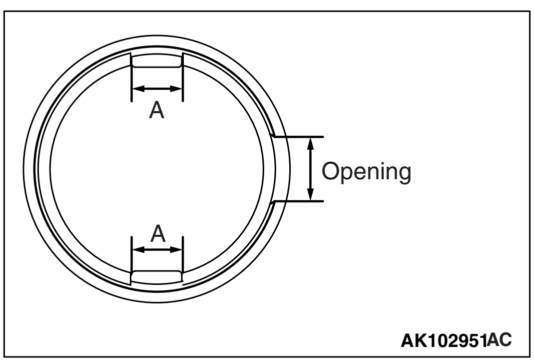


Apply blue petrolatum to the indicated portions of the brake piston in order to prevent it from being damaged during installation.

>>B<< SNAP RING INSTALLATION



1. Compress the return spring by holding down the spring retainer using the special tools.
   - Spring compressor retainer (MD998924)
   - Spring compressor (MD999577)

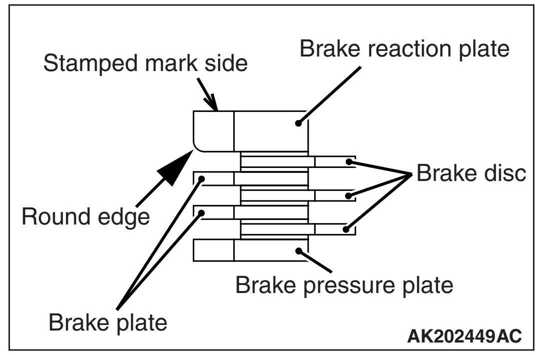


⚠ CAUTION

Never locate the ends at the positions A shown.

2. Install the snap ring with its ends directed as shown in the illustration.

>>C<< BRAKE PLATES/BRAKE DISCS/BRAKE REACTION PLATE/BRAKE PRESSURE PLATE INSTALLATION

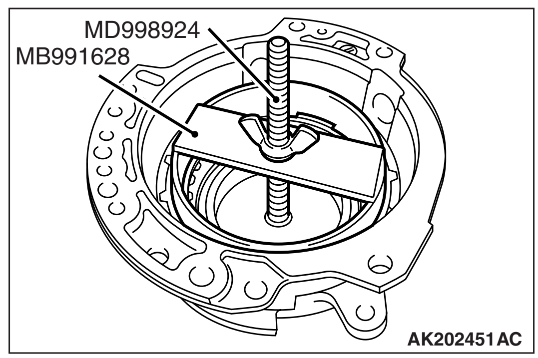


⚠ CAUTION

Immerse the brake discs in ATF before assembling them.

Install the brake plates, brake discs, brake reaction plate and brake pressure plate, directing their ends as shown in the illustration.

>>D<< SNAP RING INSTALLATION



1. Fit the snap ring in the groove formed in the reverse brake retainer.
2. Press all around the brake reaction plate using the special tools.
   - Spring compressor retainer (MD998924)
   - Spring compressor (MB991628)
3. Check whether the clearance between the snap ring and brake reaction plate conforms to the standard value.
4. If the clearance deviates from the standard value, adjust it by changing the snap ring to a one of an appropriate size.

Standard value: 1.6 – 1.8 mm

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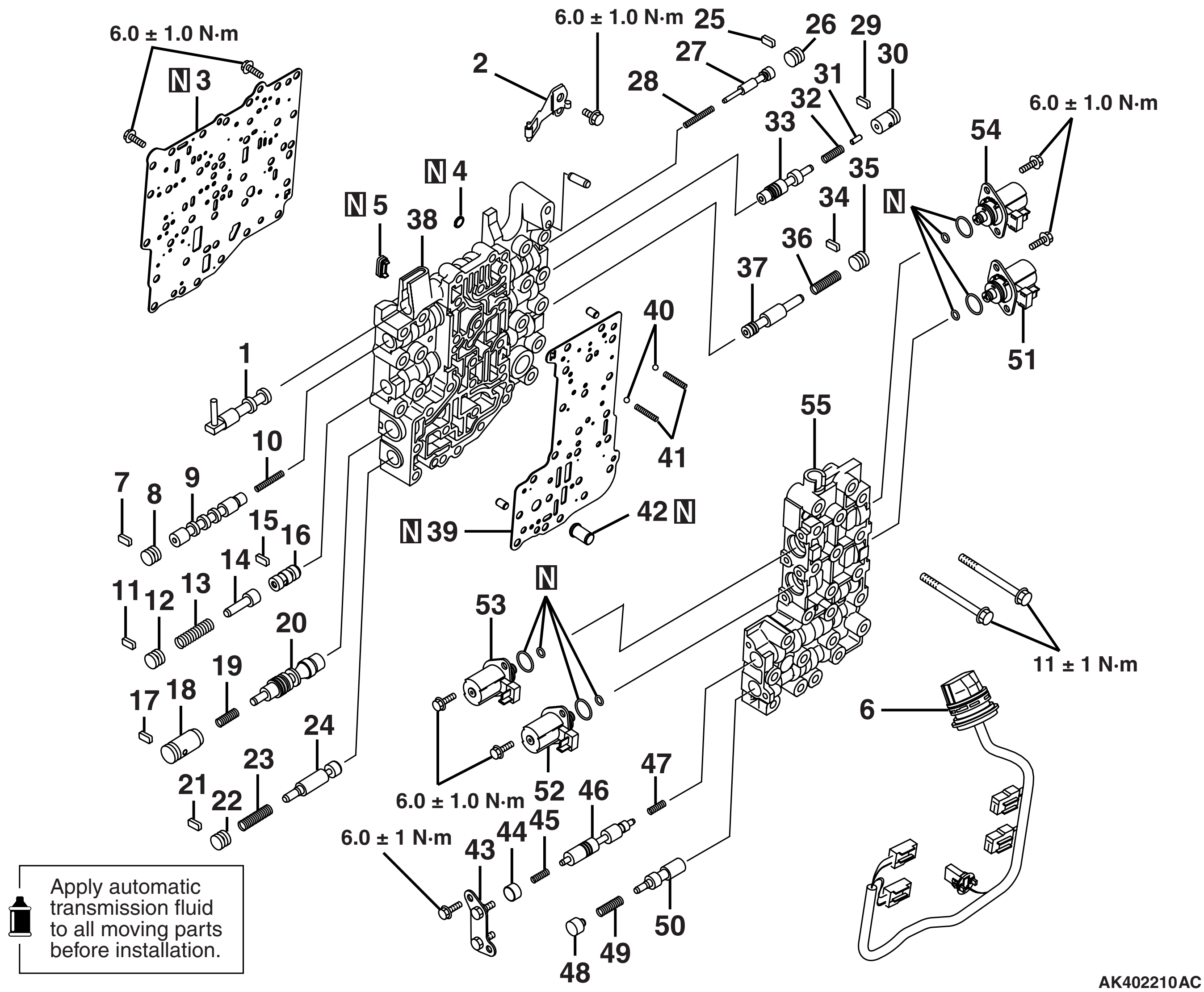
VALVE BODY

DISASSEMBLY AND REASSEMBLY

M1233211000073

⚠ CAUTION

- **The valve body assembly underwent fluid pressure adjustments at the factory. Do not disturb setting of the adjusting screw.**
- **The shift control solenoid valve must be installed into the original position whenever it has been removed. Otherwise the factory-adjusted primary pressure characteristics will be affected.**



Disassembly steps

1. Manual valve
2. Detent spring
3. Inside separating plate
4. >>E<< Oil strainer
5. Oil strainer
6. <<A>> >>D<< Solenoid valve harness
7. Stopper plate
8. Stopper plug
9. Damper clutch control valve
10. Damper clutch control valve spring
11. Stopper plate
12. Stopper plug

Disassembly steps (Continued)

13. Line pressure relief valve spring
14. Line pressure relief valve
15. Stopper plate
16. Line pressure relief sleeve
17. Stopper plate
18. Regulator valve sleeve
19. Regulator valve spring
20. Regulator valve
21. Stopper plate
22. Stopper plug
23. Torque converter pressure control valve spring

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Disassembly steps (Continued)

24. Torque converter pressure control valve
25. Stopper plate
26. Stopper plug
27. Clutch pressure control valve
28. Clutch pressure control valve spring
29. Stopper plate
30. Clutch pressure reducing sleeve
31. Needle roller
32. Clutch pressure reducing valve spring
33. Clutch pressure reducing valve
34. Stopper plate
35. Stopper plug
36. Primary pressure relief valve spring
37. Primary pressure relief valve
38. Inside valve body
39. Outside separating plate

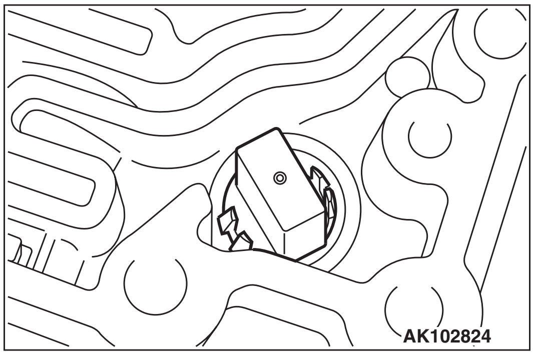
Disassembly steps (Continued)

	>>**C**<<	40. Steel ball
	>>**C**<<	41. One-way valve spring
	>>**C**<<	42. Oil strainer
<<**B**>>	>>**B**<<	43. Adjusting screw assembly
		44. Plug
		45. Shift control valve spring
		46. Shift control valve
		47. Shift control valve spring
		48. Plug
		49. Reducing valve spring
		50. Reducing valve
<<**C**>>	>>**A**<<	51. Line pressure control solenoid valve
<<**C**>>	>>**A**<<	52. Shift control solenoid valve
<<**C**>>	>>**A**<<	53. Dumper clutch control solenoid valve
<<**C**>>	>>**A**<<	54. Clutch pressure control solenoid valve
		55. Outside valve body

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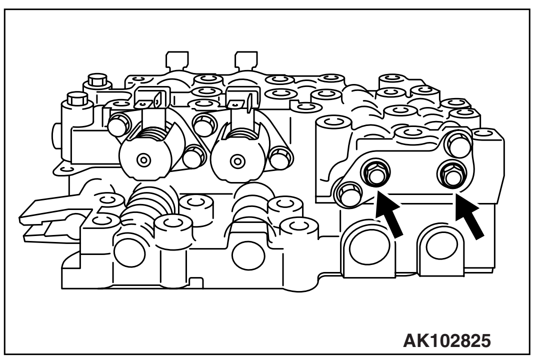
DISASSEMBLY SERVICE POINTS

<<A>> SOLENOID VALVE HARNESS REMOVAL



1. Remove the oil temperature sensor from the valve body by pressing the claws indicated in the illustration.
2. Remove all the solenoid valve harness by disconnecting their connectors from the solenoid valves.

<<B>> ADJUSTING SCREW ASSEMBLY REMOVAL

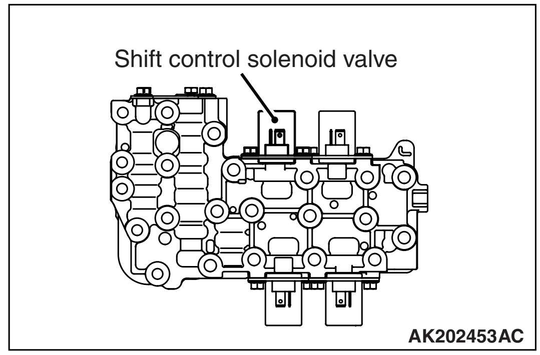


⚠ CAUTION

Never turn the adjusting screws indicated in the illustration. If either or both of them are accidentally turned, replace the whole valve body assembly.

Remove the adjusting screw assembly.

<<C>> SOLENOID VALVE REMOVAL



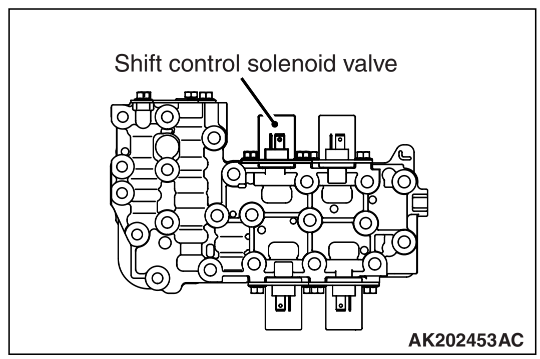
⚠ CAUTION

The shift control solenoid valve can not be replaced individually. If it requires replacement, replace the valve body assembly.

Before removing the solenoid valves, put marks on them and the valve body to help identify their locations during reinstallation.

REASSEMBLY SERVICE POINTS

>>A<< SOLENOID VALVE INSTALLATION



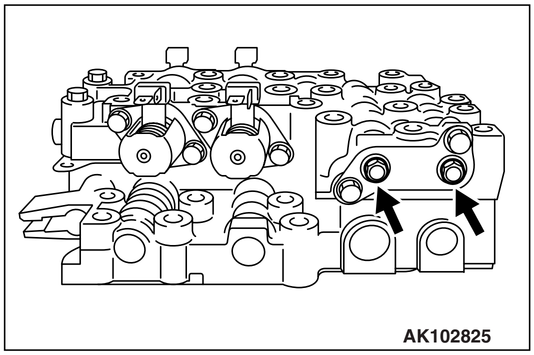
⚠ CAUTION

The shift control solenoid valve cannot be replaced individually. If it requires replacement, replace the valve body assembly.

Set new O-rings on solenoid valves. Install the solenoid valves into correct locations in accordance with the marks made at the time of removal.

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>>B<< ADJUSTING SCREW ASSEMBLY INSTALLATION

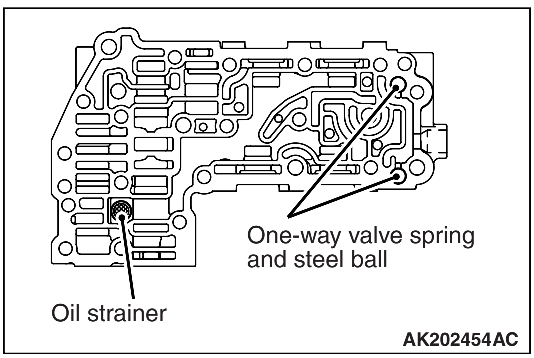


⚠ CAUTION

Never turn the adjusting screws indicated in the illustration. If either or both of them are accidentally turned, replace the whole valve body assembly.

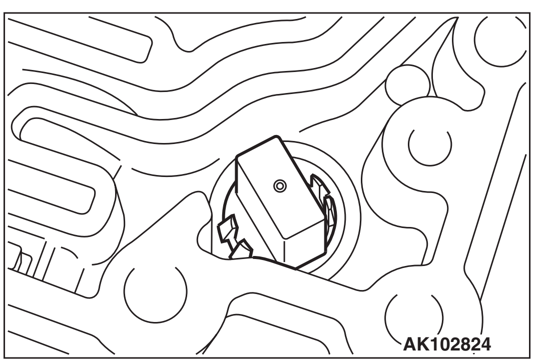
Install the adjusting screw assembly in portion.

>>C<< OIL STRAINER/ONE-WAY VALVE SPRING/STEEL BALL INSTALLATION

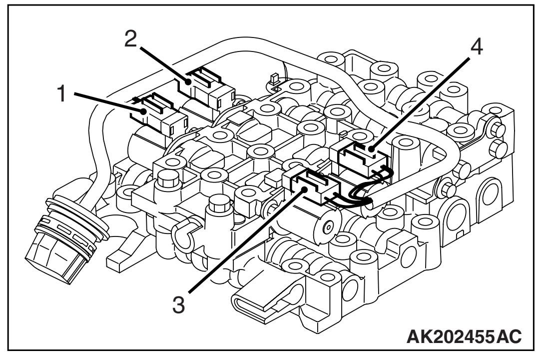


Install the oil strainer, one-way valve springs and steel balls into the indicated locations.

>>D<< SOLENOID VALVE HARNESS INSTALLATION



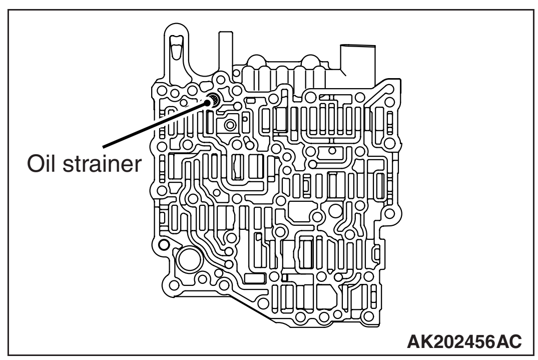
1. Fit the claws of the oil temperature sensor indicated in the illustration snugly in the valve body.



2. Connect the solenoid valve harness connectors to the corresponding solenoid valves correctly.

Location	Solenoid valve	Wire colour code	Connector housing colour
1	Clutch pressure control solenoid valve	Yellow, red, red	Milky white
2	Line pressure control solenoid valve	Orange, yellow, yellow	Black
3	Dumper clutch control solenoid valve	Green, yellow	Milky white
4	Shift control solenoid valve	Blue, red	Black

>>E<< OIL STRAINER INSTALLATION



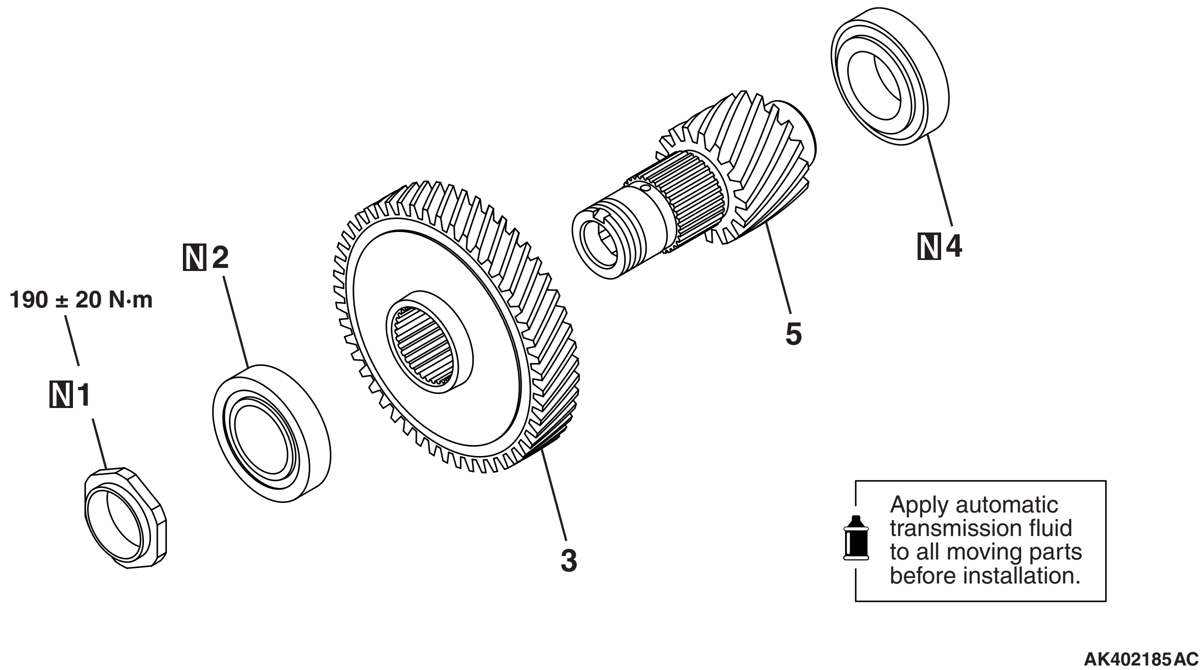
Install the oil strainer into the indicated location.

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OUTPUT SHAFT

DISASSEMBLY AND REASSEMBLY

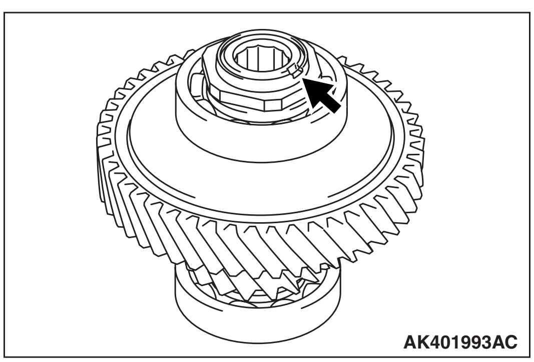
M1233212000139



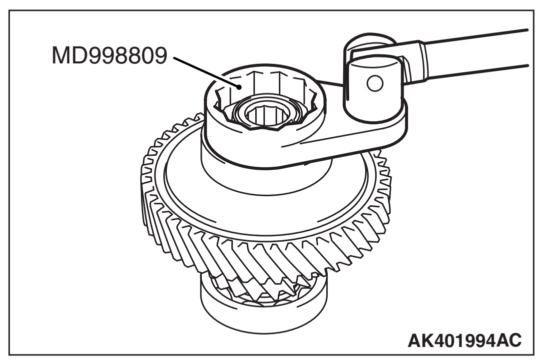
			Disassembly steps
<<A>>	>>C<<	1.	Lock nut
<<B>>	>>B<<	2.	Ball bearing
		3.	Transfer driven gear
<<C>>	>>A<<	4.	Ball bearing
		5.	Output shaft

DISASSEMBLY SERVICE POINTS

<<A>> LOCK NUT REMOVAL

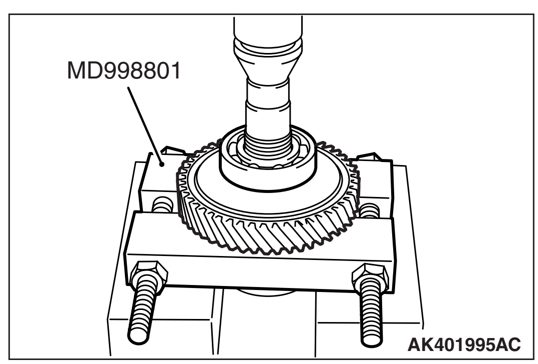


1. Undo staking of the lock nut.



2. Remove the lock nut using the special tool Lock nut wrench (MD998809).

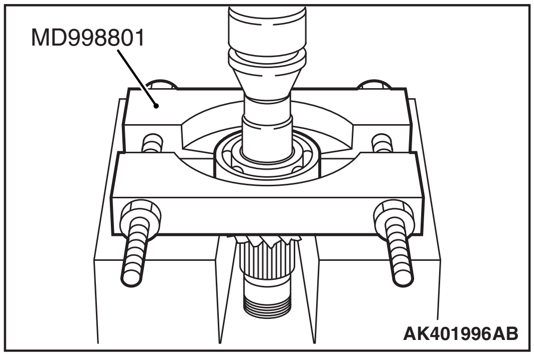
<<B>> BALL BEARING REMOVAL



Use the special tool Bearing remover (MD998801) to remove the ball bearing.

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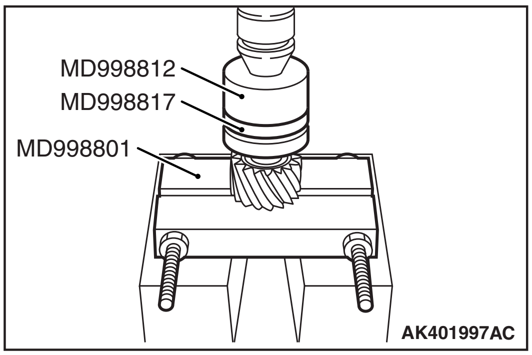
<<C>> BALL BEARING REMOVAL



Use the special tool Bearing remover (MD998801) to remove the ball bearing.

REASSEMBLY SERVICE POINTS

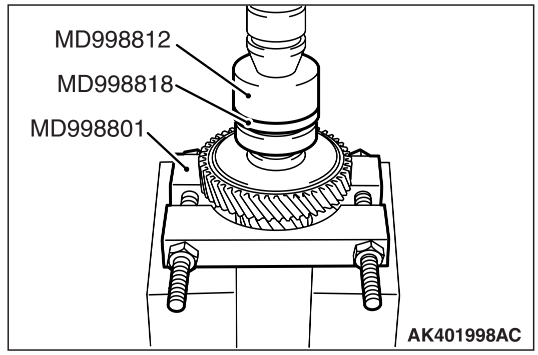
>>A<< BALL BEARING INSTALLATION



Use the special tools to install the new ball bearing.

- Installer cap (MD998812)
- Installer adapter (MD998817)
- Bearing remover (MD998801)

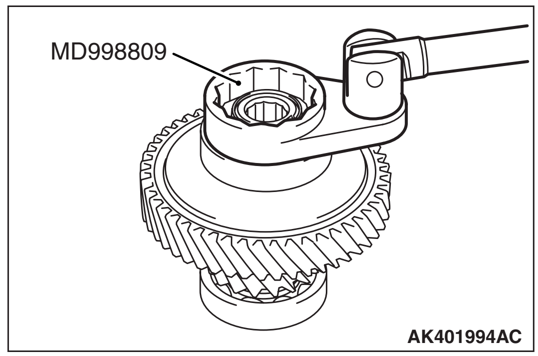
>>B<< BALL BEARING INSTALLATION



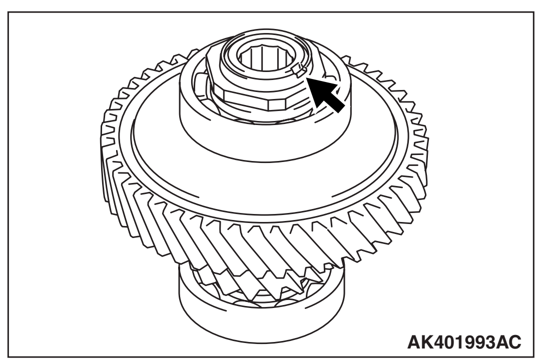
Use the special tools to install the new ball bearing.

- Installer cap (MD998812)
- Installer adapter (MD998818)
- Bearing remover (MD998801)

>>C<< LOCK NUT INSTALLATION



1. Apply ATF to the thread portion of the lock nut before installation.
2. Use the special tool Lock nut wrench (MD998809) to tighten the lock nut to the specified torque of 190 ± 20 N·m.
3. Loosen the lock nut one complete turn, then tighten it again to the specified torque.



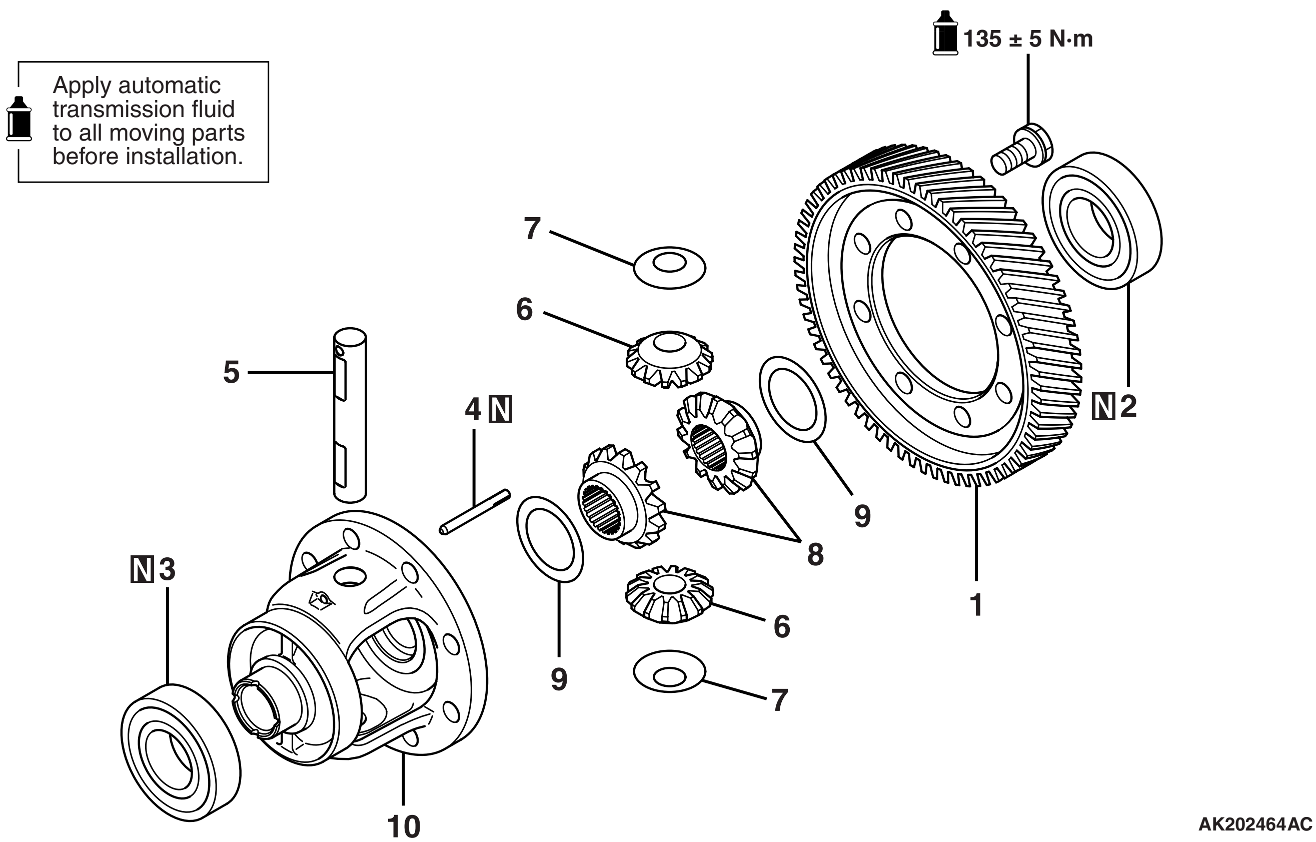
4. Stake the lock nut securely into the notch in the output shaft.

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DIFFERENTIAL

DISASSEMBLY AND REASSEMBLY

M1233213000110

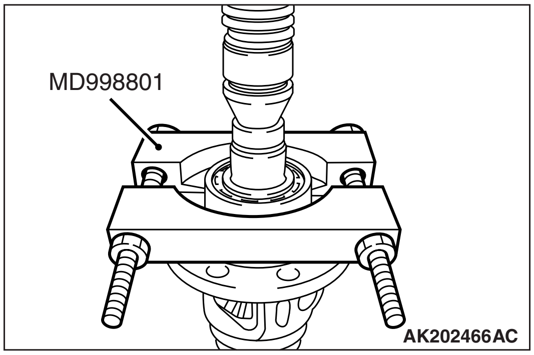


			Disassembly steps
	>>**E**<<	1.	Differential drive gear
<<**A**>>	>>**D**<<	2.	Ball bearing
<<**B**>>	>>**C**<<	3.	Ball bearing
	>>**B**<<	4.	Lock pin
	>>**A**<<	5.	Pinion shaft

		Disassembly steps (Continued)
>>**A**<<	6.	Pinion
>>**A**<<	7.	Washer
>>**A**<<	8.	Side gear
>>**A**<<	9.	Spacer
	10.	Differential case

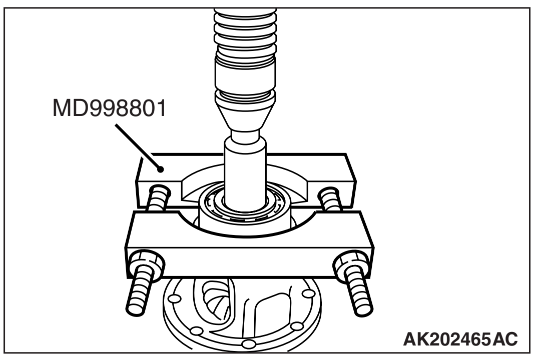
DISASSEMBLY SERVICE POINTS

<<A>> BALL BEARING REMOVAL



Use the special tool Bearing remover (MD998801) to remove the ball bearing from the differential case.

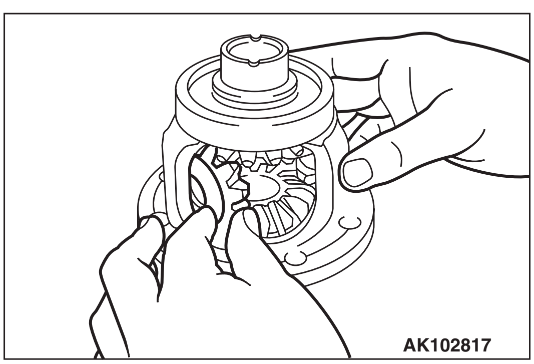
<<B>> BALL BEARING REMOVAL



Use the special tool Bearing remover (MD998801) to remove the ball bearing from the differential case.

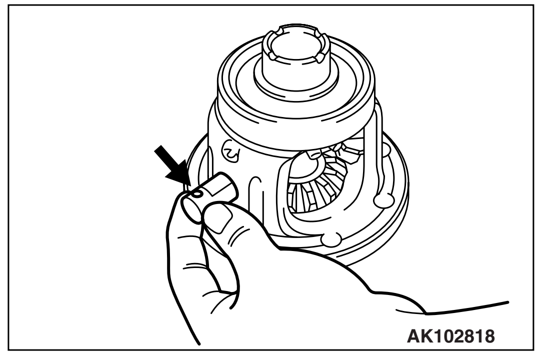
REASSEMBLY SERVICE POINTS

>>A<< SPACER/SIDE GEAR/WASHER/PINION/PINION SHAFT INSTALLATION

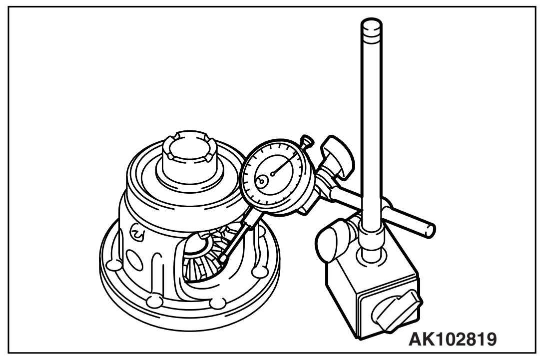


1. Fit the spacer on the back side of each side gear.
2. Install the side gears fitted with the spacers into the differential case.

NOTE: . Use spacers of a thickness of 0.93 – 1.00 mm when installing new side gears.



3. Fit the washer on the back side of each pinion. Mesh both the pinions simultaneously with the side gears, then bring the pinions into position inside the differential case while rotating them.
4. Insert the pinion shaft into the differential case while aligning the lock pin holes.



5. Measure the backlash between each side gear and the pinion.

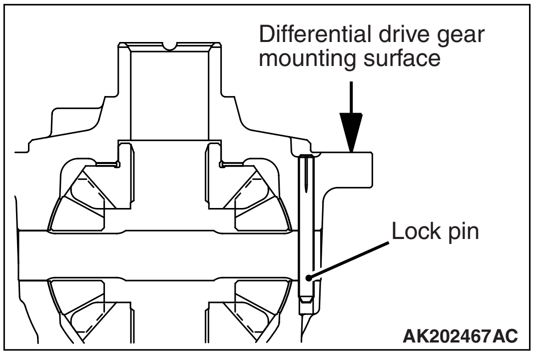
   Standard value: 0.025 – 0.150 mm

6. If the backlash deviates from the standard value, replace the spacer of the side gear with a one of an appropriate thickness and measure the backlash again for confirmation.

NOTE: The backlash on one side gear should be equal to that on the other after adjustments.

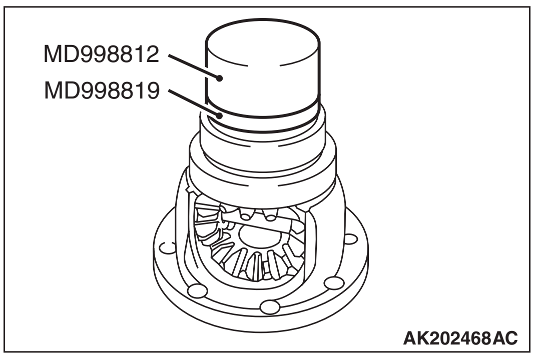
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>>B<< LOCK PIN INSTALLATION



Insert the lock pins into the differential case using a press with a force larger than 5 kN until their top ends are lower than the differential drive gear mounting surface.

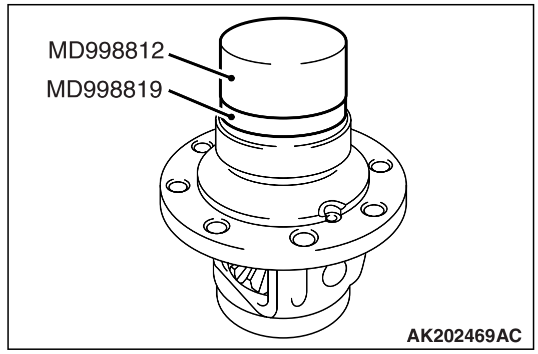
>>C<< BALL BEARING INSTALLATION



Use the special tools to install the new ball bearing on the differential case.

- Installer cap (MD998812)
- Installer adapter (40) (MD998819)

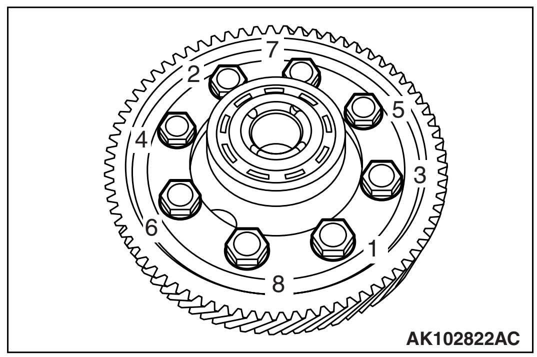
>>D<< BALL BEARING INSTALLATION



Use the special tools to install the new ball bearing on the differential case.

- Installer cap (MD998812)
- Installer adapter (40) (MD998819)

>>E<< DIFFERENTIAL DRIVE GEAR INSTALLATION



1. Place the differential drive gear in position on the differential case.
2. Apply ATF to each of the bolt and tighten the bolts in the numbered sequence to the specified torque of 135 ± 5 N·m.